



Transportation Concept Report

State Route 4 East Contra Costa

District 4

June 2017



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Caltrans Mission Statement

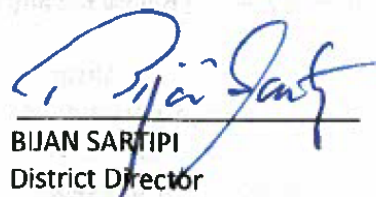
Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability

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STAKEHOLDER ACKNOWLEDGEMENT

District 4 is pleased to acknowledge the time and contributions of stakeholders and partner agencies to this TCR. Development of System Planning documents such as this one is dependent upon the participation and collaboration of key stakeholders. This TCR represents a cooperative planning effort for State Route (SR) 4 East Contra Costa (SR 4 East CC). Representatives of the Contra Costa Transportation Authority, the City of Oakley, the City of Brentwood, and the County of Contra Costa provided essential information, advice and feedback for the preparation of this document.

This Final TCR will be posted on the Caltrans District 4 System Planning website at:

<http://www.dot.ca.gov/dist4/systemplanning/>

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ABOUT THE TRANSPORTATION CONCEPT REPORT

System Planning is the long-range Transportation Planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by evaluating conditions and proposing enhancements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans goals of safety and health; stewardship and efficiency; sustainability, livability, and economy; system performance; and, organizational excellence.

The System Planning process is primarily composed of four parts: the District System Management Plan (DSMP), the Transportation Concept Report (TCR), the Corridor System Management Plan (CSMP), and the District System Management Plan (DSMP) Project List. The District-wide **DSMP** is a strategic policy and planning document that focuses on maintaining, operating, managing, and developing the transportation system. The **TCR** is a planning document that identifies the existing and future route conditions as well as future needs for each route on the SHS. The **CSMP** is a complex, multi-jurisdictional Planning document that identifies future needs within freeway corridors experiencing or expected to experience high levels of congestion. The CSMP serves as a TCR for segments covered by the CSMP. The **DSMP Project List** is a list of planned and partially programmed transportation projects used to recommend projects for funding. These System Planning products are also intended as resources for stakeholders, the public, partner, regional, and local agencies.

TCR Purpose

California's State Highway System needs long-range planning documents to guide the logical development of transportation systems as required by CA Gov. Code §65086 and as necessitated by the public, stakeholders, and system users. The purpose of the TCR is to evaluate current and projected conditions along the route and communicate the vision for the development of each route in each Caltrans District during a 20-25 year Planning horizon. The TCR is developed with the goals of safety and health; stewardship and efficiency; sustainability, livability, and economy; system performance; and, organizational excellence through integrated management of the transportation network, including the highway, transit, pedestrian, bicycle, freight, operational improvements and travel demand management components of the corridor.

STAKEHOLDER PARTICIPATION

Stakeholder participation was sought throughout the development of the SR 4 East CC TCR. During the information gathering stage for the TCR, stakeholders were contacted for initial input related to their particular interests, and to help verify data accuracy. As the document was finalized, stakeholders were asked to review the document for accuracy and consistency with regard to existing plans, policies, and procedures. The final document was shared with stakeholder groups as a method of information sharing. The process of including stakeholders adds value to the TCR by allowing for outside input and ideas to be reflected in the document and help strengthen public support.

EXECUTIVE SUMMARY

CONCEPT SUMMARY

The State Route (SR) 4 East Contra Costa County corridor (SR 4 East CC) is an 18.36-mile segment of the larger SR 4. SR 4 East CC is located entirely in the eastern portion of Contra Costa County in District 4. Beginning at Post Mile (PM) R30.13 at the interchange of SR 160 and SR 4 near Antioch, SR 4 East CC proceeds as a 6.54-mile long north/south freeway/expressway to the Marsh Creek Road/Vasco Road intersection. From that intersection (PM R37.9) SR 4 East CC continues in a west/east alignment 11.81 miles to the Contra Costa/San Joaquin (CC/SJ) County line, terminating at PM 48.39. SR 4 East CC traverses the cities of Antioch, Oakley, and Brentwood, Census Designated Place of Discovery Bay, and portions of unincorporated east Contra Costa County.

Prior to the adoption of the current alignment, SR 4 ran through downtown Oakley and downtown Brentwood. A cooperative effort between Contra Costa County and the cities of Antioch, Brentwood, and Oakley developed the State Route 4 Bypass project. This project was developed in the *East County Corridor Study* of the late 1980's, prepared by Caltrans, Alameda and Contra Costa Counties, the cities of Antioch, Brentwood, and Livermore, and the Contra Costa Water District. The preferred alternative (and later selected alignment) bypasses the downtown areas of Brentwood and Oakley to ease traffic congestion, and provide access to the growing areas of southeast Antioch and western Brentwood. The SR 4 Bypass Authority, was created in a Joint Power Agency Agreement of Contra Costa County and the cities of Antioch, Brentwood, and Oakley to work with Caltrans to implement the project. The project was funded by fees placed on new developments from a regional-funding agency, the East Contra Costa Regional Fee and Financing Authority (ECCRFFA). The project was completed and adopted into the State Highway System (SHS) in January of 2012.

The larger SR 4 begins at San Pablo Avenue in Hercules, California and terminates at SR 89, near Markleeville, CA. The total length of the route is 197 miles.

Segment 1 of SR 4 East CC is a six-lane access-controlled freeway from the SR 4/SR 160 interchange in Antioch (PM R30.13) to Contra Costa Canal (PM R31.32). After Contra Costa Canal, the freeway transitions to four lanes, with interchanges at Laurel Road, Lone Tree Way, and Sand Creek Road. From Sand Creek Road, SR 4 East CC becomes a four-lane expressway until the intersection at Balfour Road. The expressway between Balfour Road and Marsh Creek Road reduces to two-lanes, and the intersections at Balfour Road and at Marsh Creek Road are at-grade.

Segment 2 begins at the intersection of Marsh Creek Road and Vasco Road, in an unincorporated portion of east Contra Costa County. SR 4 East CC then runs west/east along Marsh Creek Road to reconnect the old SR 4 alignment at the Marsh Creek Road/Byron Highway intersection. Segment 2 is a two- to four-lane conventional highway, with left and right turn lanes and acceleration and deceleration lanes at at-grade intersections.

Most of SR 4 East CC was constructed within the past decade. Within SR 4 East CC, once the programmed capacity improvement projects within current Right-of-Way (ROW) are developed, the route is not planned for further expansion.

Table ES 1. Corridor Concept Summary

Segment	Post Mile	Segment Description	Existing Facility	20-25 Year Capital Facility Concept	20-25 Year System Operations and Management Concept
1	CC 4 R30.13 - CC 4 R38.03	SR 160/SR 4 I/C to Marsh Creek Road/Vasco Road I/C	2E – 6F	4E – 6F	Construct and maintain ramp meters, mainline detection, and changeable message signs.
2	CC 4 R38.03 - CC 4 48.39	Marsh Creek Road/Vasco Road I/C to End of County	2--4 C	4 C	Maintain

E = Expressway, F = Freeway, C = Conventional

CONCEPT RATIONALE

For the next 25 years, the existing freeway portion of Segment 1 of SR 4 East CC (from SR 160 to Balfour Road) is a four- to six-lane freeway, while the expressway portion between Balfour Road and Marsh Creek Road will be widened from two- to four-lanes and the interchange completed once that section is expanded. There are no plans for the intersection at Marsh Creek Road and Vasco Road to be converted to an interchange. Segment 2 will remain a conventional highway and will be expanded to four lanes. The expansion will help accommodate future travel demand within SR 4 East CC. In the Metropolitan Transportation Commission's (MTC) Plan Bay Area 2013 (PBA 2013), there are plans for expansion and interchanges proposed for SR 4 East CC.

PLANNED AND PROGRAMMED PROJECTS AND STRATEGIES

Table ES 2 lists programmed and planned projects found in current programming documents and various Caltrans and local plans.

Table ES 2. Planned and Programmed Projects and Strategies

Seg.	Post Mile	Description	Planned or Programmed	Location	Source
1	Approx. CC 4 34.0	Construct bicycle/pedestrian overcrossings for SR 4 East CC	Programmed	Mokelumne Coast-to-Crest Trail, located between Lone Tree Way and San Creek Road	PBA 2013
1	CC 4 T30.17 - CC 4 T30.65	Install ramp metering	Planned	In Contra Costa County, on SR 4, near the SR 160 interchange	2015 RMDP
1	CC 4 R34.13 - CC 4 R34.14	Turn on ramp metering	Planned	In Contra Costa County, on SR 4, at the Sand Creek Road interchange	2015 RMDP
1	CC 4 R34.59 - CC 4 R36.2	Construct a grade separated Balfour Road interchange (partially under construction)	Programmed	In Contra Costa County, in the City of Brentwood, at the intersection of SR 4 and Balfour Road	CC Measure J
1	CC 4 R30.13 - CC 4 R35.60	eBART Phase II: from Antioch to East Contra Costa County.	Planned	Freeway median.	eBART NSS 2014
1	CC 4 VAR - CC 4 VAR	Install Traffic Operations System (TOS) elements and fiber	Planned	NEW PROJECT, TOS on CC 160 and CC 4 from Bypass Road to SJ County Line	D4 315 Mobility Spread-sheet
1	Off System	Fund and construct planned Park and Ride facility in Oakley (6 bike lockers and 168 parking stalls)	Planned	Main Street and Cypress Road, Oakley, CA	Tri Delta Transit
1	CC 4 R33.48	New Park and Ride Lot	Planned	Mokelumne Trail and SR 4.	Local Plans
1, 2	CC 4 VAR - CC 4 VAR	Improve interchanges and parallel arterials to Route 4	Planned	Various locations	PBA 2013
1, 2	CC 4 R31.00 - CC 4 48.00	Upgrade/construct maintenance vehicle pullouts	Planned	In Contra Costa County, from Oakley to near Discovery Bay	FY 2015/16 – 2016/17 Two-Year PID Workplan for 2018 SHOPP
2	CC 4 48.1 - CC 4 48.3	Near Discovery Bay, at 0.1 mile west of Old River Bridge. Construct retaining walls to repair storm damage slip-outs.	Programmed	Near Discovery Bay, at 0.1 mile west of Old River Bridge.	2016 SHOPP
2	CC 4 43.98 - CC 4 48.39	Bicycle and pedestrian improvements on Marsh Creek Road, and SR 4 east connector, to improve east-west access.	Planned	From intersection at Marsh Creek Road and Byron Highway to CC/SJ County Line.	CCCBPP 2009
2	CC 239	Route 239 PID in Contra Costa County to construct new SR to serve traffic.	Planned	From City of Brentwood to Tracy.	PID

RMDP = Ramp Meter Development Plan

PBA = Plan Bay Area

PID = Project Initiation Document

SHOPP = State Highway Operation and Protection Program

NSS = Next Segment Study

FY = Fiscal Year

CCCBPP = Contra Costa Countywide Bicycle and Pedestrian Plan

CC Measure J = Contra Costa County Sales Tax Measure (2004)

PROPOSED PROJECTS AND STRATEGIES

The following proposed projects and strategies include projects by local transit authorities, improvements to address poor pavement conditions reported by the Pavement Condition Index, and Active Transportation improvements. This TCR also recommends multimodal improvements that will help accommodate travelers of all modes and promote more sustainable modes of travel. Lastly, this document proposes the expansion of Segment 1 (from Balfour Road to Marsh Creek Road) from two- to four-lanes to prepare for an increase in freight truck traffic, the potential construction of SR 239, and for concurrency with Segment 2's expansion from two- to four-lanes.

Currently, the high-occupancy vehicle (HOV) lanes on SR 4 begin/end outside the SR 4 East CC Corridor, approximately two miles west of SR 160. There are no plans to implement HOV lanes within the Corridor at this time. The MTC, the Bay Area's Metropolitan Planning Organization (MPO) has plans for a 550-mile express lane network. SR 4 in its entirety is not included in this network. Therefore, this TCR does not recommend HOV or express lanes to the SR 4 East CC Corridor.

Table ES 3. Proposed Projects to Help Achieve Route Concept

Seg.	Description	Location
1	Improve pavement conditions	PM R30.13 – R37.90
1	Install mainline detection sensors	PM R35.19 – R38.03
1	Expand SR 4 from two- to four-lanes, from Balfour Road to Marsh Creek Road	PM R35.60 – PM R37.90
1	Study new <i>Amtrak</i> San Joaquins Station location in Oakley	Off system, near BNSF rail route in Oakley
2	Widen Route 4 as continuous 4-lane arterial from Marsh Creek Road to San Joaquin County line.	PM R38.03 – 48.39
2	Near Discovery Bay, develop Class I Shared Path or Class IV Cycle Track and sidewalk	PM 45.0 – 47.0
2	Improve pavement conditions	PM R38.03 – 48.39
2	Study potential bicycle facilities on Segment 2, all bike classes included	PM 43.98 – 48.39

CORRIDOR OVERVIEW

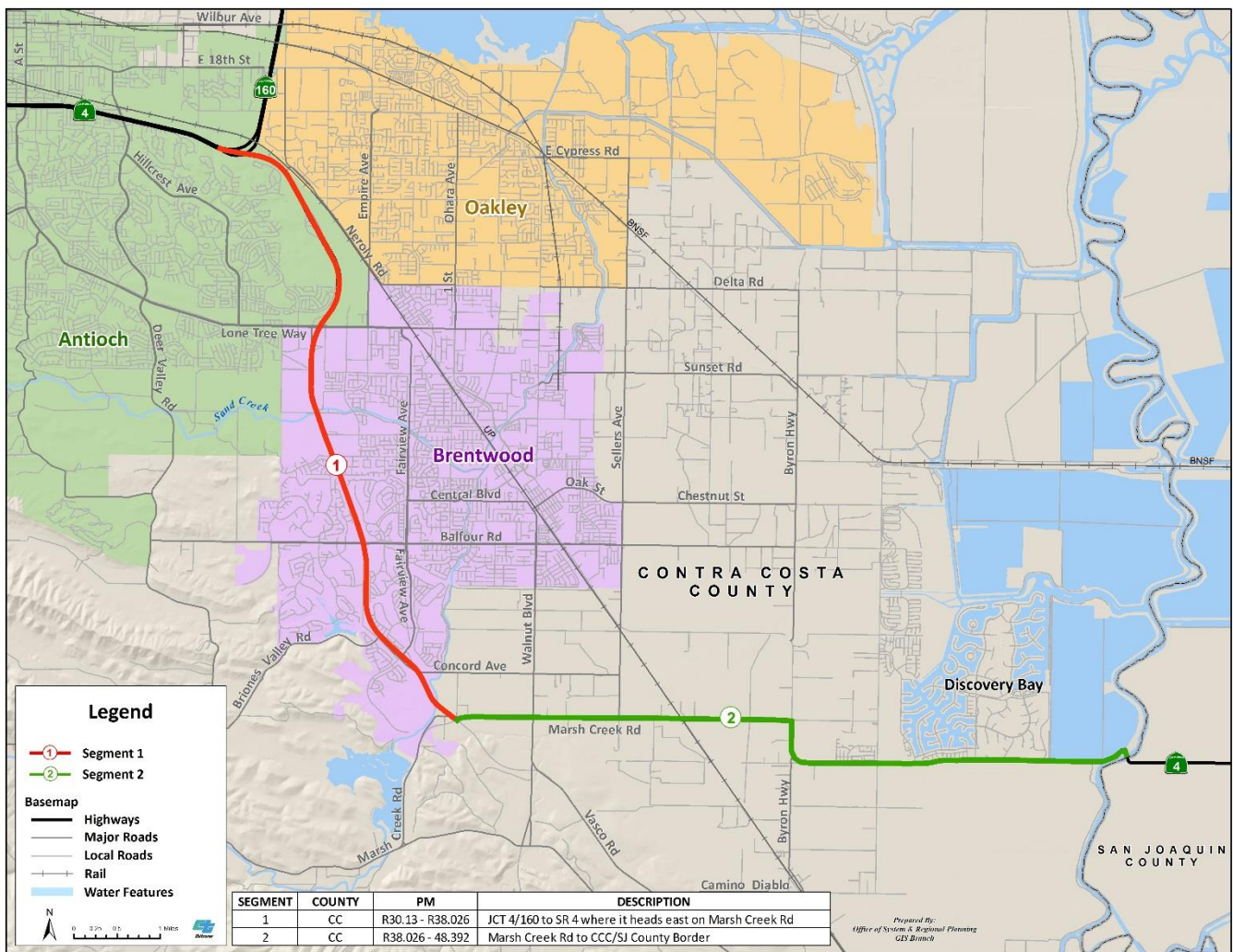
ROUTE SEGMENTATION

For the purpose of this TCR, the SR 4 East CC Corridor has been divided into two segment, as shown in Table 1 and Figure 1.

Table 1. SR 4 East CC Segments

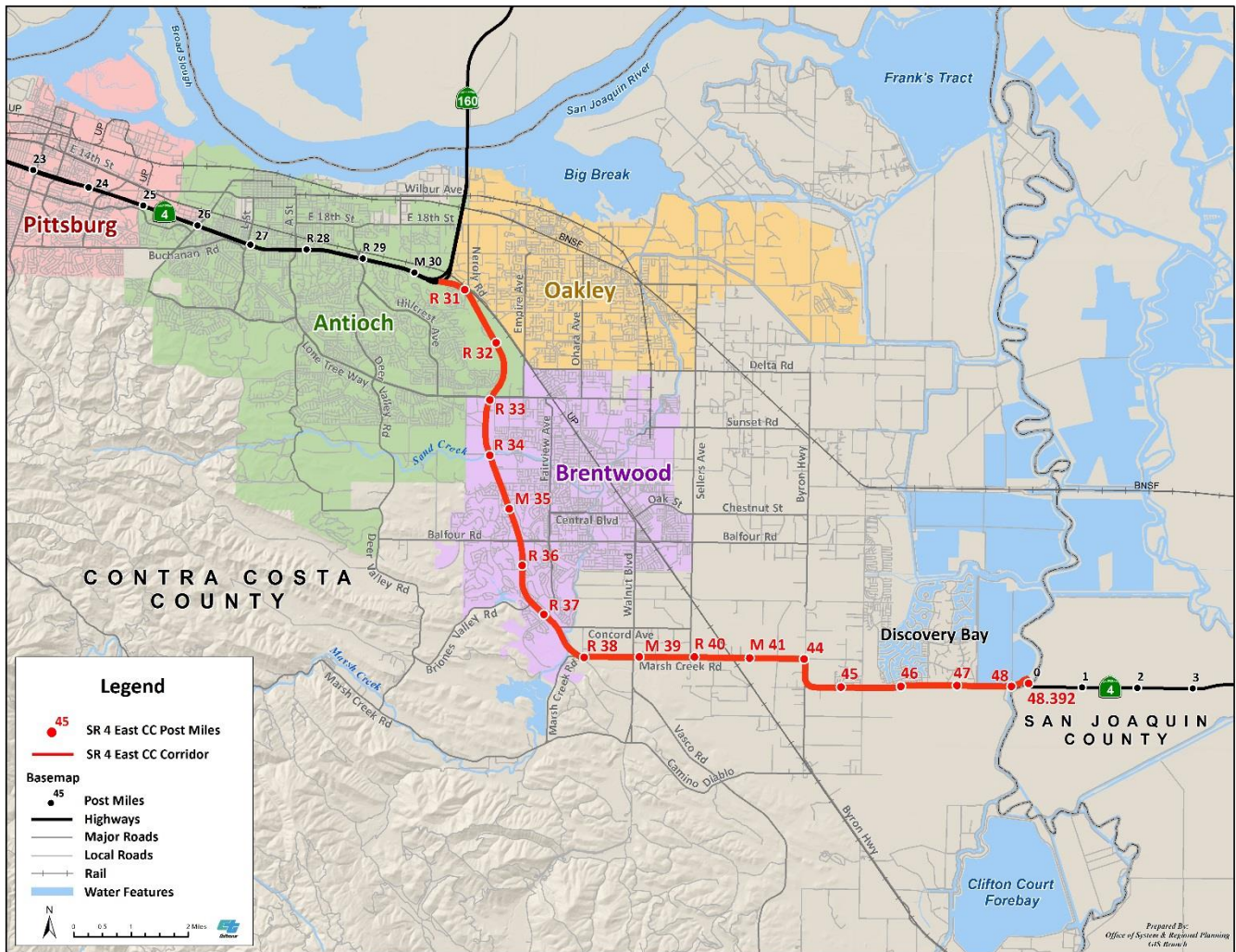
Segment #	Location Description	County Route Beg. PM	County Route End PM
61	SR4/SR 160 I/C to Marsh Creek Road/Vasco Road I/S	CC 4 R30.13	CC 4 R38.03
2	Marsh Creek Road/Vasco Road I/S to End of County	CC 4 R38.03	CC 4 48.39

Figure 1: SR 4 East CC Segmentation Map



Source: Caltrans GIS Unit

Figure 2: SR 4 East CC Post Mile Map



Source: Caltrans GIS Unit

ROUTE DESCRIPTION

Route Location:

California Streets and Highways Code Section 430 describes the location of SR 4 as extending “from Route 80 in Hercules to Route 5 in Stockton via north of Concord and via Antioch” and continues east to SR 89 near Markleeville, CA.¹ Within Caltrans District 4, SR 4 East CC is located entirely in Contra Costa County.

Segment 1, starts at post mile (PM) R30.13, from the SR 4/SR 160 interchange to the Marsh Creek Road/Vasco Road intersection (PM R38.03). The north/south aligned segment runs 6.54 miles, and is alternatively known as “John Marsh Heritage Highway.” The segment traverses a flat to rolling terrain, primarily through residential and commercially-zoned land uses. This segment begins as a freeway and then transitions to an expressway.

¹ <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=shc&group=00001-01000&file=300-635>, accessed September of 2016.

Segment 2 of SR 4 East CC continues 11.81 miles in a west/east orientation along Marsh Creek Road, turning south on Byron Highway, then east to the CC/SJ County line (PM 48.39). The segment runs on a flat terrain, and the primary land uses are residential and agricultural. The segment is functionally classified as a principal arterial.

Route Purpose and Local Initiatives:

In the late 1980s, Caltrans, the counties of Alameda and Contra Costa, the cities of Antioch, Brentwood, and Livermore, and the Contra Costa Water District prepared the *East County Corridor Study*. The study examined feasible alternatives for a transportation corridor between SR 4 and I-580 in Alameda County. The preferred alternative was the initial alignment of the Delta Expressway, which would later be known as the SR 4 Bypass.

In January of 2012 the portion of SR 4 that ran through the downtown areas was relinquished to the joint State Route 4 East CC Authority (Authority) consisting of the cities of Antioch, Brentwood, and Oakley, and Contra Costa County, and the SR 4 Bypass was adopted into the SHS. The transfer also included the relinquishment of the aforementioned segment to the four members of the Authority. The relinquishment required a \$4.01 million financial contribution from the Authority to the local agencies.²

Interregional and regional traffic accounts for a significant portion of the traffic on SR 4 East CC. The corridor is an important freight corridor as it experiences relatively high truck traffic that provides Contra Costa County and other Bay Area communities with direct access to the Port of Stockton, which significantly impacts local traffic. The majority of trips along the corridor are attributed to residential and retail growth, local commuter travel, goods movement, and recreational trips. SR 4 East CC facilitates regional traffic between the SR 4 Corridor and the Tri-Valley and the San Joaquin Valley, providing overall regional and State connectivity.

Major Route Features:

SR 4 East CC traverses the cities of Antioch, Oakley, and Brentwood, and portions of unincorporated east Contra Costa County. SR 4 East CC is designated as an Interregional Road System (IRRS). SR 4 East CC is vital to commuting, freight, and recreational traffic and is the only IRRS route in Contra Costa County that connects to the San Joaquin Valley.

Segment 1 of SR 4 East CC includes three separate sections: a six-lane freeway, a four-lane freeway with three interchanges, and a two-lane expressway with two at-grade intersections.

Segment 2 begins at the Marsh Creek Road/Vasco Road intersection, in an unincorporated portion of east Contra Costa County. SR 4 East CC then runs easterly along Marsh Creek Road to reconnect the old SR 4 alignment at the Marsh Creek Road/Byron Highway intersection. Segment 2 is a two to four-lane conventional highway, with left and right turn lanes and merging lanes at at-grade intersections. There are multiple driveways along Segment 2.

Additionally, there are two traversable highways that might potentially have an impact on SR 4 East CC in the future. A traversable highway are unconstructed routes that have been approved by California legislation as future State Highway Routes. SB 802, approved in 2003, made two traversable highways near the corridor eligible as interregional and inter-county routes. One of the traversable highways is SR 84, defined as between I-580 and SR 4 at the intersection of Marsh Creek Road and Vasco Road. Another traversable highway that has undergone further studies from federally earmarked funds is SR 239, defined as connecting I-580 west of Tracy to SR 4. SR 239 is discussed further in the Transit Section. Caltrans supports connecting these unconstructed routes to SR 4 in the future.

Route Designations and Characteristics:

² http://www.dot.ca.gov/hq/transprog/ctcbooks/2012/0112/55_2.3a1_Transfer_SR4_CCC_rev.pdf, accessed June of 2016

Table 2. Route Description by Segment

Segment #	1	2
Freeway & Expressway	Yes	No
Strategic Highway Network (STRAHNET)	No	No
Scenic Highway	No (Eligible State Scenic Highway – Not Officially Designated)	No (Eligible State Scenic Highway – Not Officially Designated)
Interregional Road System	Yes	Yes
Federal Functional Classification	2 – Other Freeway or Expressway	3 – Other Principal Arterial
Goods Movement Route	Yes	Yes
Truck Designation	65' CA Legal Route, and 65' CA Legal KPRA Advisory	65' CA Legal KPRA Advisory
Rural/Urban/Urbanized	Urbanized/Rural	Urbanized/Rural
Metropolitan Planning Organization	Metropolitan Transportation Commission (MTC)	MTC
Congestion Management Agency	Contra Costa Transportation Authority (CCTA)	CCTA
Local Agency	Contra Costa County, City of Oakley, City of Brentwood	Contra Costa County
Tribes	n/a	n/a
Air District	Bay Area Air Quality Management District (BAAQMD)	BAAQMD
Terrain	Flat to Rolling (urban setting)	Flat

KPRA = kingpin-to-rear-most-axle distance

COMMUNITY CHARACTERISTICS

SR 4 East CC travels through three incorporated communities – the cities of Antioch, Oakley, and Brentwood – and through unincorporated east Contra Costa County, mostly along the west/east traversing portion of SR 4 East CC. Please see Table 3 on page 10 for more socio-economic and demographic information.

The three municipal jurisdictions along SR 4 East CC have a higher proportion of English language speakers at home, population density, average household size, individuals who drive alone to work, and mean travel times to work than that of the Contra Costa County average. The lack of jobs located in east Contra Costa County might explain why each of the jurisdictions have higher mean travel time to work than Contra Costa County as a whole.

Contra Costa County is projected to see a population increase of 27 percent, and a 38 percent increase in employment by 2040. Housing will need to be developed to prepare for the population increase; a twenty percent increase is expected in housing unit projections.³ The cited PBA 2040 document further breaks down growth projections by jurisdiction and Priority Development Area's (PDA) [see the Land Use section on Page 10 for description].

³ Plan Bay Area 2040 Final Preferred Scenario and Investment Strategy, 2016.

Table 3. Cities of Antioch, Oakley, and Brentwood Demographics Compared to Contra Costa County

	City of Antioch	City of Oakley	City of Brentwood	Contra Costa County
Total Population (2010)	102,372	35,432	51,481	1,049,025
Hispanic or Latino (2010)	31.7%	34.9%	26.8%	24.4%
White Alone (2010)	35.6%	47.5%	54.3%	47.8%
Black or African American Alone (2010)	16.7%	6.9%	6.2%	8.9%
Asian Alone (2010)	10.1%	5.9%	7.6%	14.2%
*Other (2010)	5.8%	4.7%	5.1%	4.8%
Language Spoken at Home – English Only	77.0%	68.7%	77.2%	66.5%
Population Density (people/square mile)	3,611.1	2,235.0	3,481.7	1,465.2
Number of Households	32,900	11,136	17,138	380,183
Average Household Size	3.19	3.35	3.15	2.82
Number of Housing Units	34,849	11,484	17,523	400,263
Owner-Occupied Housing Units	61.0%	74.7%	73.5%	65.0%
Median Household Income	\$65,770	\$78,597	\$88,697	\$79,999
Drive Alone to Work (2014)	70.90%	75.09%	76.65%	67.41%
Mean Travel Time to Work (minutes)	41.1	39.8	40.8	34.3

Source: Data compiled from the U.S. Census Bureau. <http://www.census.gov>, accessed September of 2016.

* Other includes: American Indian and Alaska Native Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, and Two or More Races.

LAND USE

SR 4 East CC travels along the southeastern jurisdictional boundary of the City of Antioch, and the western edge of the City of Oakley and the City of Brentwood, then traverses through unincorporated east Contra Costa County. This part of the Bay Area is known for its agricultural products, such as cherries, corn, and peaches.

Along Segment 1, there are a handful of shopping centers – Lone Tree Plaza, Slatten Ranch Shopping Center, and The Streets of Brentwood – located mostly in Brentwood, that serve as local economic attractions.

The land uses along Segment 2 of SR 4 East CC primarily include residential and agricultural, with commercial uses scattered along the Segment. According to Contra Costa County's General Plan, the local land uses along SR 4 East CC include: "Agricultural Core, Agricultural Land, Parks and Recreation, Multiple Family Residential – Low Density, Public/Semi-Public, and Single-Family Residential – High Density, Office, Commercial, Light Industry, Commercial Recreation, and Delta Recreation and Resources."⁴ There is an existing middle school along Byron Highway just south of Segment 2, and a proposed high school to the east. Students are forecasted to come from the Discovery Bay neighborhood, and might have implications for travel patterns along Segment 2.

The area has seen a large boom in housing since 2000, a growth trend which is expected to continue. However, there are no major development projects proposed in the vicinity of SR 4 East CC.

Priority Development Areas and Priority Conservation Areas

PBA 2013 is a long-range integrated transportation and land-use/housing strategy and serves as the Regional Transportation Plan (RTP) for the San Francisco Bay Area. PBA 2013 responds to Senate Bill (SB) 375 (2008) which requires metropolitan regions in the State to develop a Sustainable Communities Strategy (SCS) to accommodate future population growth while reducing greenhouse gas emissions from cars and light trucks. The identification

⁴ www.gismap.ccmmap.us/imf/imf.jsp?site=ccmap

and establishment of local PDAs will help focus 80 percent of new housing and 66 percent of new jobs forecast for the region. Priority Conservation Areas (PCA) were developed simultaneously for existing parks and open space as well as other areas that need protection from further development.

PDAs are locally designated areas within existing communities that have been identified and approved by local cities or counties for future growth. These areas are typically located near transit, jobs, shopping and other services. PCAs are areas identified through consensus by local jurisdictions and park/open space districts as lands in need of protection due to pressure from urban development or other factors. MTC produced the RTP in concert with the Association of Bay Area Governments (ABAG) who is responsible for developing regional housing and employment forecasts. Within the Plan's horizon year (2040), population estimates for the Bay Area include two million new residents and a total population topping nine million. PDAs in Contra Costa County help accommodate a large share of forecasted growth in the Bay Area region. As of 2016, MTC is in the process of developing PBA 2040, which is the strategic update to PBA 2013.

California Transportation Plan

SB 391 of 2009 requires Caltrans to update the California Transportation Plan (CTP) by December 31, 2015 and every five years thereafter. The CTP shall identify the integrated multimodal transportation system needed to achieve maximum feasible greenhouse gas emissions reductions to 1990 levels by 2050 and 80 percent below 1990 levels by 2050 (as required by Assembly Bill 32). In addition, SB 391 requires the CTP to incorporate transportation policies and system performance objectives from approved RTPs produced by the Metropolitan Planning Organization's (MPO). Caltrans must also consult, coordinate, and make drafts of the CTP available for review and comment to the following agencies: California Transportation Commission, Strategic Growth Council, State Air Resources Board, State Energy Resources Conservation and Development Commission, Air Quality Management Districts, public transit operators, Regional Transportation Planning Agencies, MPOs and other interested parties. The current CTP was approved in June of 2016.

Smart Mobility Framework

In 2010 Caltrans introduced the concept of Smart Mobility to its Transportation Planning process and established the Smart Mobility Framework (SMF) for the State. Smart Mobility is defined by moving people and freight while enhancing California's economic, environmental and human resources by emphasizing convenient and safe multimodal travel, speed suitability, accessibility, management of the circulation network, and efficient use of land. SMF is built on six principles: Location Efficiency, Reliable Mobility, Health and Safety, Environmental Stewardship, Social Equity, and Robust Economy. SMF is essentially a tool for planners to respond to the mobility needs of all users while balancing economic prosperity, environmental quality and social equity. SMF helps achieve the goals of reducing per capita vehicle miles traveled and addressing Climate Change challenges presented in AB 32 and SB 375.

Based on the location efficiency principle, SMF introduces seven "place types" to help inform transportation decision making. Each of the seven place types represent a distinct context where implementation of certain transportation investments, along with Planning and management strategies, will help improve location efficiency and achieve Smart Mobility benefits. Table 4 identifies the Place Types for the two segments of SR 4 East CC and offers potential transportation programs and appropriate project ideas for each of them.

Table 4. Smart Mobility Framework Place Type by Segment

Segment	Place Type	Transportation Programs and Projects
1	Suburban Communities - Neighborhoods	<i>Investment that improve the operational efficiency of existing arterial and freeway corridors.</i> <i>Projects that improve connectivity leading to shorter average trip lengths and increased non-auto mode share.</i> <i>Investments in “complete streets” and safe routes to school measures that improve conditions for walking and bicycling.</i>
2	Rural and Agricultural Lands	<i>Outside of towns, safety improvements to walking and bicycling facilities on rural roads.</i> <i>Effective speed management at the transition from highway to rural town and on main streets in rural towns accompanied by reduced speeds to maintain and create walkable rural towns in designated locations.</i>
	Protected Lands	<i>Where public access and recreational use is permitted, bicycle facility and trail projects.</i> <i>Connectivity increases through protected lands only when no other options are available to provide required interregional connectivity.</i>

SYSTEM CHARACTERISTICS

The following sections discuss various system characteristics of SR 4 East CC, including physical characteristics, bicycle facilities, pedestrian facilities, transit facilities, freight facilities, and environmental considerations. Table 5 presents existing and future physical characteristics of SR 4 East CC. The future concept of each segment is briefly discussed in this section. Please see the “Corridor Concept” section for further information and conceptual vision for the Corridor.

Segment 1 starts as a six-lane divided freeway then narrows down to a four-lane freeway and later a two-lane expressway. Roughly 3.75 miles prior to Marsh Creek Road, SR 4 East CC converges, and becomes an undivided expressway. This segment was constructed to provide an alternative to the original alignment so that SR 4 would bypass the downtown areas of Oakley and Brentwood. According to the 2013 Caltrans Pavement Condition Survey, distressed pavement conditions (see Figure 4 below for clarification) are found on both segments of SR 4 East CC. For Segment 1, pavement distress level is considered “Bad/Poor Ride Only.”

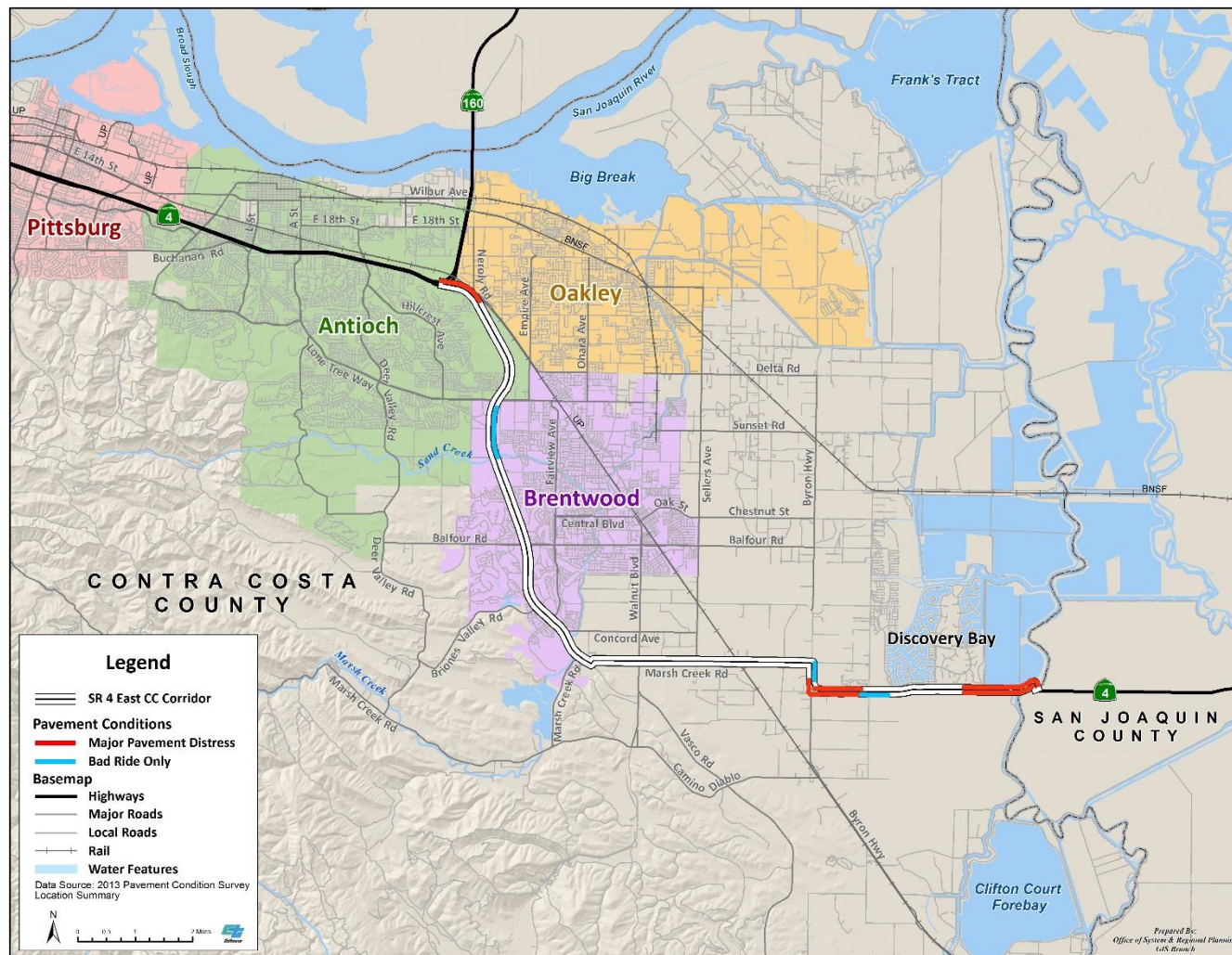
Segment 2 is currently a two- to four-lane undivided conventional highway, and traverses in a west/east orientation. There are no passing lanes found on this segment, but turn lanes and/or acceleration/deceleration lanes exist at most intersections along Segment 2. Traffic signals exist where SR 4 East CC intersects with Walnut Boulevard, Byron Highway, Bixler Road, and Discovery Bay Boulevard. Intersections with the local streets that are not signalized, are stop sign controlled. Additionally, there are multiple driveways leading to adjacent residential properties and parking lots for local commercial and agricultural businesses. The route assumes a north/south alignment for roughly half a mile on Byron Highway, then reassumes an west/east alignment titled “State Route 4,” with no alternate name designated (e.g., Byron Highway or John Marsh Heritage Highway), toward and beyond the Contra Costa County line. As shown on Figure 3, distressed pavement also exists along Segment 2, and distress levels are classified as “Bad/Poor Ride Only” and “Major Pavement Distress”, according to 2013-2015 data.

Table 5. SR 4 East CC System Characteristics

Segment #	1	2
Existing Facility		
Facility Type	E/F	C
General Purpose Lanes	2 – 6	2 – 4
Lane Miles	25.4	20.7
Centerline Miles	6.5	11.8
Median Width	0 – 100 ft	0 ft
Median Characteristics	Unpaved	Unpaved
HOV Lanes	0	0
HOV Characteristics	n/a	n/a
HOT/Express Lanes	0	0
HOT/ Express Lanes Characteristics	n/a	n/a
Toll Lanes	0	0
Toll Lane Characteristics	0	0
BRT Lanes	0	0
Passing Lanes	0	0
Truck Climbing Lanes	0	0
Current ROW	40-220 ft	50 – 120 ft
Concept Facility		
Facility Type	E/F	C
General Purpose Lanes	2 – 6	2 – 4
Lane Miles	25.4	20.7
Centerline Miles	6.5	11.8
HOV Lanes	0	0
HOT Lanes	0	0
BRT Lanes	0	0
Toll Lanes	0	0
Passing Lanes	0	0
Truck Climbing Lanes	0	0

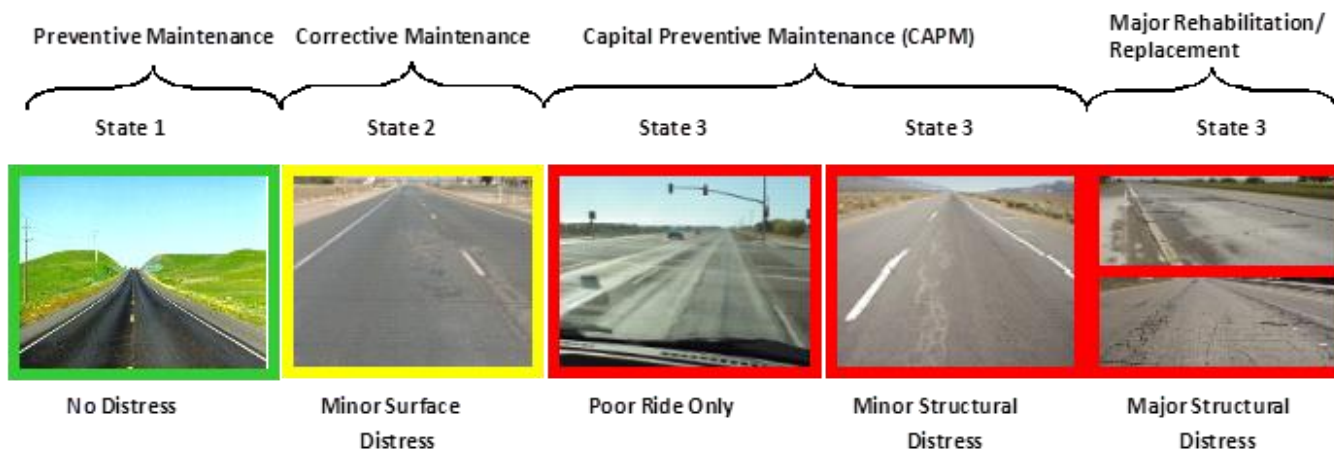
As indicated in Figure 4, “Poor Ride Only” and “Major Structural Distress” both represent “State 3” of pavement distress levels. The corresponding treatments are called Capital Preventive Maintenance (CAPM) projects and Major Rehabilitation/Replacement respectively, which should be applied to affected sections on both segments of the SR 4 East CC. This TCR recommends pavement improvement projects (see Table 13 on Page 30).

Figure 3: SR 4 East CC Pavement Condition Map (2013-2015)



Source: Caltrans GIS Unit, 2013-2015

Figure 4: Pavement Distress Level and Corresponding Treatment



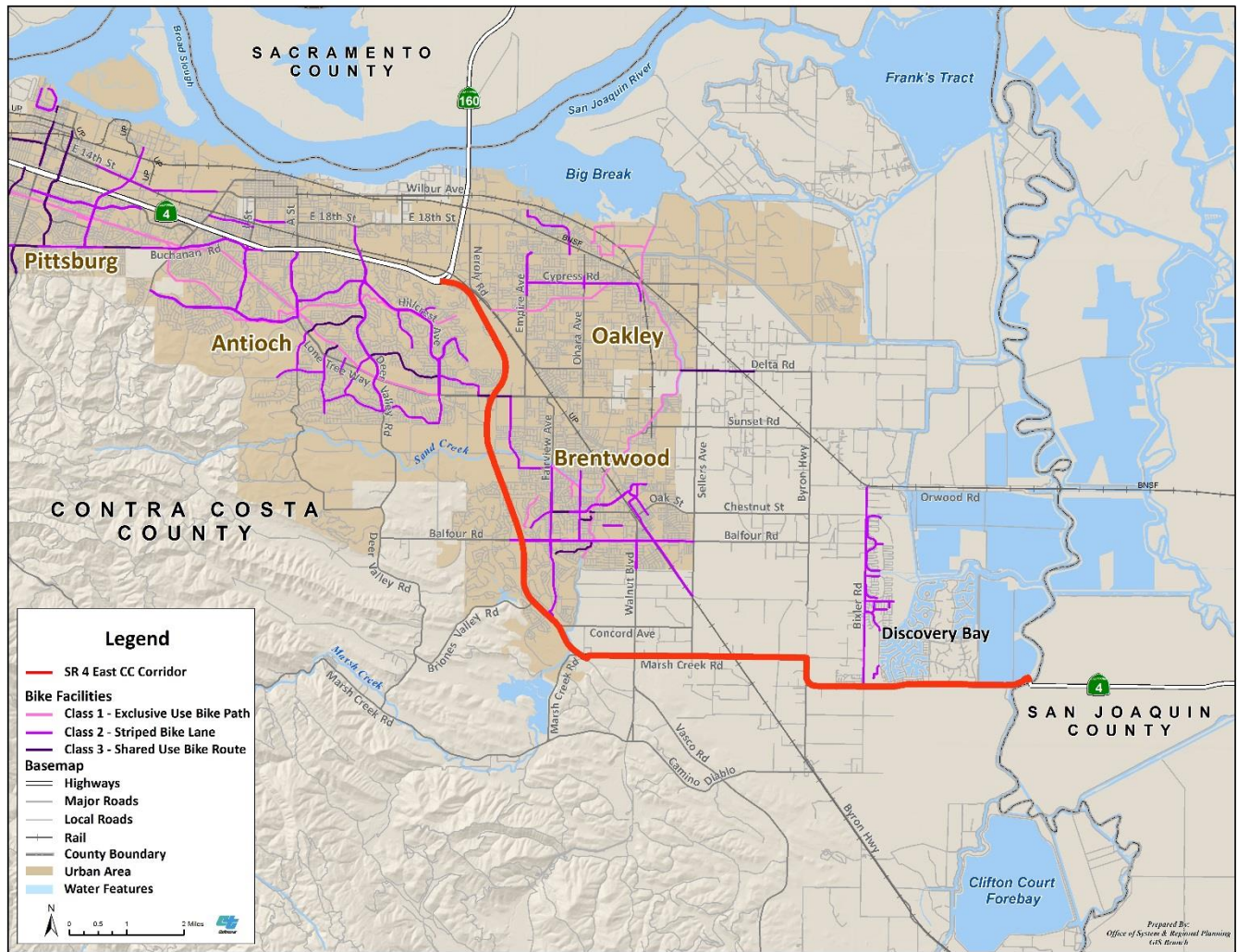
State 1: Good/excellent condition with few potholes or cracks ⇒ Preventive maintenance project

State 2: Fair condition with minor cracking or slab cracking ⇒ Corrective maintenance project

State 3: Poor condition with significant to extensive cracks or poor ride only ⇒ CAPM, rehabilitation or reconstruction project

BICYCLE FACILITY

Figure 5: SR 4 East CC Bicycle Facilities Map



Source: Caltrans GIS Unit

Table 6 lists bicycle facilities on SR 4 East CC, a larger version of Figure 5 can be found in the Appendix. For discussion purposes, SR 4 East CC is divided into two bicycle facility segments, which correspond with the two roadway segments respectively. Segment 1 is not listed as a bicycle route, nor is bicycle access permitted. Along this segment, there are five opportunities to cross the freeway (and expressway) as a bicyclist or pedestrian; four of which share the road with automobiles and the other is designated as a regional (Class I) trail. To travel along this restricted segment of SR 4 East CC, a bicyclist will have to utilize local and regional bicycle networks on roads with bicycle facilities such as Balfour Road. Segment 2 does not prohibit bicycle access, however there are no bicycle facilities located on this segment.

There are three regional trails that traverse through, or near SR 4 East CC. They include the Delta de Anza Trail, which connects Oakley, Antioch, Pittsburg, and Bay Point; the Marsh Creek Regional Trail, which runs from Brentwood through Oakley and north to the Delta; and the future Mokelumne Aqueduct Regional Trail is planned to run through Martinez, Concord, Pittsburg, Antioch and Brentwood.⁵

⁵ Contra Costa Countywide Bicycle and Pedestrian Plan, 2009, p. 57.

For SR 4 East CC, it is recommended that additional bicycle facilities be developed along both segments of SR 4 East CC. An additional bicycle and pedestrian overcrossing over Segment 1 is recommended by this TCR. The overcrossing would connect the Brentwood Lake neighborhood and communities west of SR 4 East CC to the trails and communities east of SR 4 East CC (PM M35.19). Additionally a bicycle and pedestrian overcrossing is planned at the intersection of the Mokelumne Coast-to-Crest Trail and SR 4 East CC, as listed within the Contra Costa Countywide Bicycle and Pedestrian Plan and PBA 2014 (partial funding for the project has been secured by the City of Brentwood).

Segment 2 of SR 4 East CC doesn't have a network that caters to Active Transportation modes. Bicycles and pedestrians are not prohibited on Segment 2 and there are residential and commercial land uses along the segment. However, it should be noted the speed limits are high, at 50 to 55 miles per hour, and may impact the safety of active mode users. Improvement should focus on how to safely accommodate bicycles and pedestrians along this segment.

The County proposes Class II or Class III bicycle facilities along the segment, but Caltrans is open to studying the impact of Class I or Class IV bicycle facilities. There is sufficient opportunities within the right-of-way for Caltrans to further examine bicycle and pedestrian infrastructure development. The General Plan for the County would need to be amended to include projects in their jurisdiction.

Along Segment 2, the 2009 Contra Costa Countywide Bicycle and Pedestrian Plan proposed a 5.5-mile Class II/III facility along SR 4 East CC.⁶ This TCR also recommends a Class I Shared Path or a bi-directional Class IV Cycle Track along the north side of SR 4 East CC, to connect the residential communities in Discovery Bay to the Sandy Cove Shopping Center (approximately PM 45.0 – 47.0). See Appendix for bicycle classification definitions.

Table 6. SR 4 East CC Bicycle Facilities

Segment	State Bicycle Facility									
	Seg ID	Post Mile	Location Description	Bicycle Access Prohibited	Facility Type	Outside Paved Shoulder Width	Facility Description	Vol.	Role	Posted Speed Limit
1	A	R30.13 - R38.03	Junction with SR160/SR4 I/C to Marsh Creek Road/Vasco Road I/C	Yes	n/a	>8 ft.	None	n/a	Regional	55-65 mph
2	B	R38.03 - R48.39	Marsh Creek Road/Vasco Road I/C to County line	No	Shared	7 - 15 ft.	Shared Roadway	n/a	Local	55 mph

⁶ <http://www.ccta.net/uploads/5297adc44d334.pdf>, accessed December of 2016.

PEDESTRIAN FACILITY

Table 7 lists pedestrian facilities on SR 4 East CC. SR 4 East CC has been divided into two pedestrian facility segments, which correspond with the two roadway segments. Like the previous section, Segment 1 is not listed as a pedestrian route, nor is pedestrian access permitted on the freeway facility.

Pedestrian access is not restricted on Segment 2. Ample shoulder space exists so that pedestrians may access the route, though no permanent infrastructure has been constructed. Traffic speeds are high, at 50 to 55 mph, which might impact the safety of pedestrians. Pedestrian demand might exist, particularly near the Sandy Cove Shopping Center and Discovery Bay; in such a case, a sidewalk could be developed along with proposed bicycle infrastructure. Should pedestrian infrastructure be developed in the future, driveways may pose as points of conflict.

Table 7. SR 4 East CC Pedestrian Facilities

Seg	Seg ID	Post mile	Location Description	Ped. Access Prohibited	Sidewalk Present	Sidewalk Width	Crossing Distance	Facility Description
1	C	R30.13 - R38.03	Junction with SR 160 to the Junction with Marsh Creek Road	Yes	No	n/a	n/a	No sidewalk present
2	D	R38.03 - R48.39	Junction with Marsh Creek Road to the County Line	No	No	n/a	n/a	No sidewalk present, ample shoulder space, high speed traffic

TRANSIT FACILITY

Table 8 on page 19 lists transit services within the Corridor. There is public transit that operates on and near SR 4 East CC through two main transit service providers: Bay Area Rapid Transit (BART) and Tri Delta Transit. Commuter rail service includes the San Francisco International Airport to Pittsburg/Bay Point BART line, which will eventually expand service to Antioch through the east Contra Costa County BART Extension (eBART). Once the facility is constructed and transit service is operational, Tri Delta Transit will provide 60-minute off-peak, and 30-minute peak period service to the future transit station in Antioch.⁷ Construction, in coordination with the SR 4 widening, on the ten-mile extension began in early 2011, and service is projected to begin operations in winter of 2017/2018.⁸ The new rail service will utilize Diesel Multiple Unit (DMU) railcars to operate in the median of SR 4, connecting to existing BART service at a transfer-only station just east of the Pittsburg/Bay Point Station, eventually terminating in Antioch.

BART has conducted the *eBART Next Segment Study* (2014) that examines the median of SR 4 East CC as the next alignment for Phase II of eBART. The study examines five potential locations in the ROW of SR 4 East CC, and a sixth potential station near Discovery Bay, one of which will be selected as the lone station and terminus of eBART Phase II.⁹

Additionally, Tri Delta Transit operates traditional and express bus service on or near SR 4 East CC. Express Route #300 operates between Pittsburg and Brentwood. Though the route doesn't directly operate on SR 4 East CC, it connects the City of Brentwood to the Pittsburg/Bay Point BART station. Traditional bus routes include #395, #386, and #385. Route #395 directly accesses SR 4 East CC beginning and ending a loop at the Antioch Park and Ride facility. Route #386 operates on Segment 2 of SR 4 East CC, with bus stops located at the Brentwood Park and Ride

⁷ January 30, 2017, Eastern Contra Costa County Transit Authority.

⁸ http://www.bart.gov/sites/default/files/docs/eBARTFactSheet_JUNE%2015_16.pdf, accessed September of 2016.

⁹ Bay Area Rapid Transit, *eBART Next Segment Study*, 2014.

and the Discovery Bay Park and Ride. Lastly, Route #385 also directly accesses SR 4 East CC, with stops at the Brentwood Park and Ride, John Muir Medical Center in Brentwood, and Antioch Park and Ride.

Park and Ride facilities located on or within the vicinity of SR 4 East CC are owned and managed by BART (in Antioch) and Tri Delta Transit (in Brentwood and Discovery Bay). Tri Delta Transit has developed plans for another Park and Ride facility located in Oakley, but currently does not have any available funding allocation to program the project. The proposed Park and Ride facility is to be located in the northeast quadrant of the intersection of Cypress Road and Main Street in Oakley, CA, and is planned to have six bike lockers and 168 parking stalls according to the transit service provider.¹⁰ Additionally, BART and the City of Brentwood passed a resolution to support the Brentwood Transit Center, an intermodal Park and Ride facility that could serve as a future station should eBART Phase II extend beyond Hillcrest.

The San Joaquin line is an intercity passenger rail train operated by Amtrak with funding provided by Caltrans. The train operates daily, with trains running between Bakersfield and Stockton, where the route splits to Oakland and Sacramento. Amtrak provides thruway bus service at each endpoint to further provide intercity transit passenger's access to San Francisco, Los Angeles, and other destinations in Southern California, the High Desert, and the Central Coast. A portion of the Oakland to Stockton segment runs parallel to SR 4 East CC, from Oakley to the Contra Costa/San Joaquin County border.¹¹ Additionally, the City of Oakley has identified land along the BNSF line adjacent to the old town/downtown area where a Park and Ride facility with 300 parking spaces will be constructed, with the ultimate goal of adding an additional station to the San Joaquins *Amtrak* route.¹²

¹⁰ Conversation with Chief Operating Officer of Tri Delta Transit, July of 2016.

¹¹ <https://www.amtrak.com/san-joaquins-train>, accessed September of 2016.

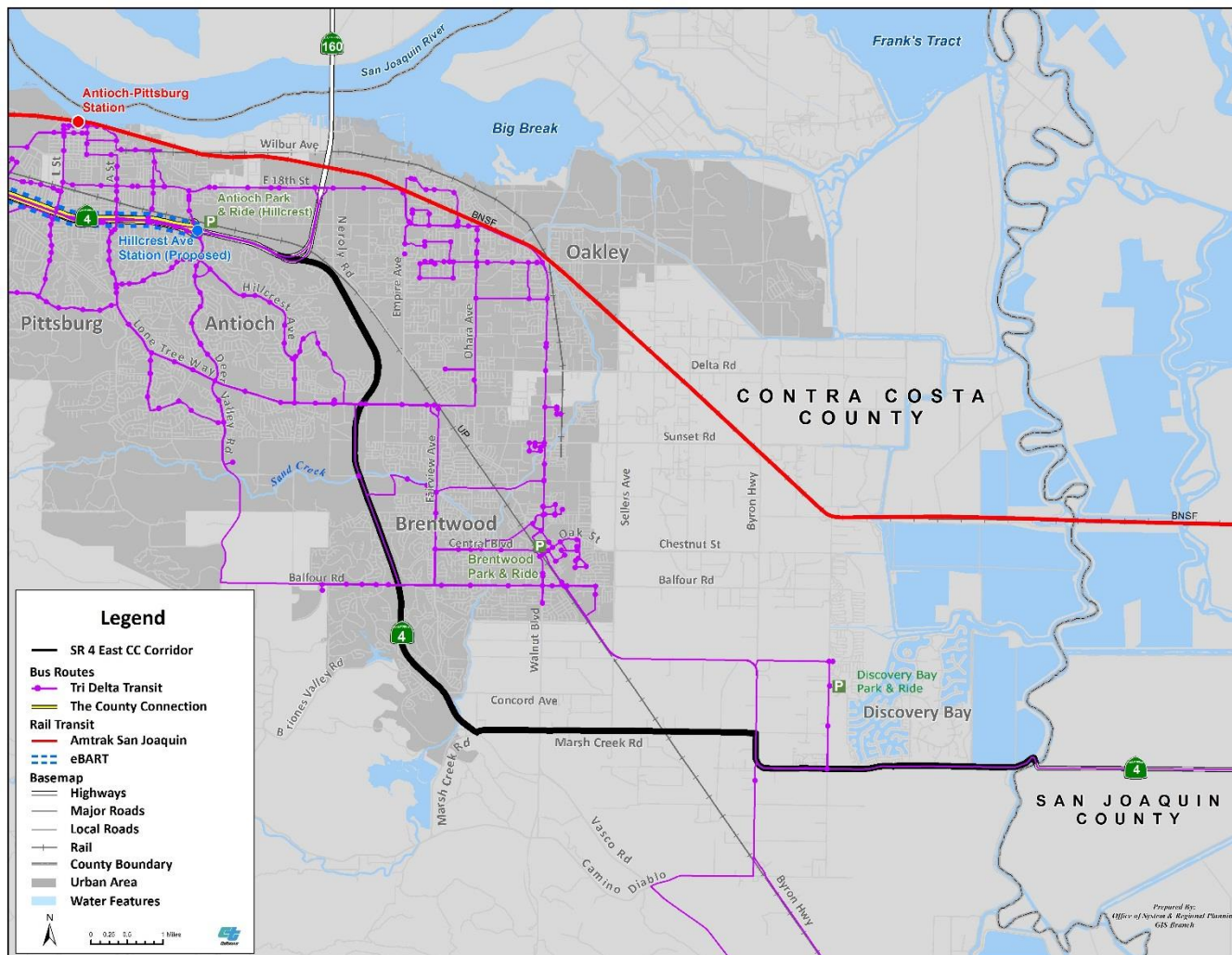
¹² <https://www.sjipa.com/getattachment/Business-Plan/15-Consideration-of-Other-Service-Expansions-and-Enhancements.pdf>, page 61

Table 8. SR 4 East CC Transit Facilities

Mode & Collateral Facility	Name	Route End Points	Headway	Operating Period	ITS & Technology	Stations		Amenities	Bikes Allowed on Transit	Location Description	# Parking Spaces
						Cities	Postmiles				
Intercity Rail	The San Joaquin	Oakland/ Sacramento to Bakersfield	n/a	4:45 AM to 1:05 AM	n/a	No stations in study area.	n/a	Lighting, Shelter	Yes	n/a	n/a
Commuter Rail	Bay Area Rapid Transit (BART)	SFO to Pittsburg (eventually Antioch via eBART)	Short	5:00 AM to 1:30 AM	n/a	Concord, Pittsburg/ Bay Point	n/a	Bike Locks, Lighting, Shelter, Real Time Transit Timing	n/a	n/a	n/a
Express Bus/BRT	Tri Delta Transit	Pittsburg to Brentwood (#300)	n/a	4:07 AM to 10:00 PM	Transit signal priority, Real-time info	Brentwood	n/a	Bike Locks, Lighting, Shelter,	3	n/a	n/a
						Oakley	n/a	Bike locks, No shelter,	3	n/a	n/a
						Antioch	n/a	Bus pad	3	n/a	n/a
			n/a	n/a	n/a	Pittsburg	n/a	n/a	3	n/a	n/a
Traditional Bus	Tri Delta Transit	Antioch to Brentwood (#395)	Long	9:40 AM to 8:07 PM	n/a	Antioch, Oakley, and Brentwood	n/a	n/a	3	n/a	n/a
	Tri Delta Transit	Brentwood to Discovery Bay (#386)	Long	6:22 AM to 4:27 PM	n/a	Brentwood and Discovery Bay	n/a	n/a	n/a	n/a	n/a
	Tri Delta Transit	Antioch to Brentwood (#385)	Medium	6:38 AM to 7:17 PM	n/a	Antioch and Brentwood	n/a	n/a	n/a	n/a	n/a
Park & Ride	BART	n/a	n/a	n/a	n/a	Antioch (Hillcrest and SR 4)	R28.75	3 Bike Lockers	n/a	Sunset Road, corner of Hillcrest & SR 4	218 ¹³
	Tri Delta Transit	n/a	n/a	n/a	n/a	Brentwood	n/a	6 Bike Lockers	n/a	Walnut Boulevard at Dainty	78
	Tri Delta Transit	n/a	n/a	n/a	n/a	Discovery Bay	n/a	6 Bike Lockers	n/a	Bixler Road at SR 4	41

¹³ Source: https://511contracosta.org/wp-content/uploads/2011_Commuter_Handbook/11-Park-Ride-Locations.pdf

Figure 6: SR 4 East CC Transit Facilities Map



Source: Caltrans GIS Unit

FREIGHT

A significant portion of SR 4 East CC is a continuous new route constructed to remove traffic, including freight trucks, and bypass the downtown areas of Oakley and Brentwood. SR 4 East CC is not part of the National Highway Freight Network, but freight truck traffic does account for a sizeable percentage of daily use. SR 4 East CC is one of three SHS facilities that traverses east to west in Contra Costa County. SR 4 East CC spans nearly the entirety of the County, and is the most expansive west/east oriented route of the three. SR 4 East CC provides a freight truck connection between the Port of Stockton, and the Bay Area.

The J4 county freight route, the portion of Byron Highway south of SR 4, intersects with SR 4 East CC (Marsh Creek Road), and travels south east adjacent to, and past Byron Airport. The J4 county freight route is a 28-mile long corridor that traverses through Contra Costa County and parts of San Joaquin County and Alameda County.

Byron Airport, established in 1994, is one of two General Aviation Airports (GAA) owned by Contra Costa County, and is located three miles south of the unincorporated Town of Byron. This GAA serves the Bay Area region by diverting small plane traffic from the primary airport runways. The facility is ideal for general aviation, including skydiving, gliding, and other recreational flight activities.¹⁴

¹⁴ <http://www.co.contra-costa.ca.us/3802/Byron-Airport-C83>, accessed August of 2016.

Average Annual Daily Truck Traffic volumes south of Brentwood near Discovery Bay are between 0 to 2,500, or 8.5 percent to 14.5 percent of all vehicles, according to MTC's Regional Goods Movement Plan (2016).

The Mountain Copper Company (MoCoCo) freight railroad line route runs loosely parallel to SR 4, from Martinez to Tracy. MoCoCo used the railroad in the early 1900s during their copper smelting operation. Union Pacific (UP) currently claims ownership to the railroad route, and has not run trains on the alignment since the mid-1990s.¹⁵ The tracks have been used for storage of freight cars since operations ceased on the rail segment. BART and the Contra Costa Transportation Authority attempted to purchase a portion of the MoCoCo Line (from Pittsburg to Tracy), for the planned eBART line. The two agencies were unsuccessful, as UP needs the line for potential reliever freight rail service to relieve congestion on their main freight lines.

Table 9. SR 4 East CC Freight Facilities

Facility Type/Freight Generator	Location	Mode	Name	Major Commodity/ Industry	Comments/Issues
Rail yard	South Suisun Bay	Rail	Port Chicago	Manufactured Products,	Currently not in operation.
Rail Line	Martinez to Tracy	Rail	MoCoCo Line Union Pacific (UP) (Class I)	n/a	The rail line is not in use, but holds the opportunity to be reestablished in the future.
General Aviation Airport	Byron	Airplane	Byron Airport (C83)	Recreation	
County Highway	San Joaquin, Alameda, and Contra Costa Counties	Truck	J4	Agriculture	28 miles long.
Port	Stockton	Sea/River	Port of Stockton	Bulk, Break Bulk, Liquid Bulk	Adjacent Caltrans District

ENVIRONMENTAL CONSIDERATIONS

The purpose of the environmental scan is to conduct a high level identification of potential environmental factors that may require future analysis in the project development process. This information may not represent all environmental considerations that exist within the corridor vicinity. The environmental factors have been categorized based on a scale of high-medium-low probability of an environmental resource issue as determined by District 4 Transportation Planning and Environmental Planning staff.

Table 10 summarizes environmental resources and potential environmental issues along the Corridor. Figure 7 also shows where these resources are located. Below is a brief discussion of where environmental factors have a higher concentration and where potential issues are found within the Corridor.

- Two historic bridges exist on or within the vicinity of SR 4 East CC:¹⁶
 - SR 4 Old River Bridge
 - Orwood Bridge

¹⁵ <http://www.co.contra-costa.ca.us/DocumentCenter/Home/View/2686>, accessed August of 2016.

¹⁶ http://historicbridges.org/b_a_county.php?county=Contra%20Costa%20County,%20California, accessed September of 2016

- SR 4 East CC is located in a seismically-active area and crosses the Midland Fault Zone.¹⁷ Segment 1 of SR 4 East CC runs parallel, just east, of the Antioch Fault.
- Species of concern found along the corridor are:
 - Alameda Whipsnake
 - California Black Rail
 - California Red-Legged Frog
 - California Tiger Salamander
 - Delta Smelt
 - Eulachon
 - Giant Garter Snake
 - Lange's Metalmark Butterfly
 - Longfin Smelt
 - Salt-Marsh Harvest Mouse
 - San Bruno Elfin Butterfly
 - San Joaquin Kit Fox
 - Steelhead Trout
 - Swainson's Hawk
 - Townsend's Big-Eared Bat
 - Tricolored Blackbird
 - Vernal Pool Ferry Shrimp
 - Vernal Pool Tadpole Shrimp
- Nonnative and invasive plant species also exist along the corridor¹⁸
- Few creeks, streams, or canals run either along or under SR 4 East CC, and none are wild and scenic rivers.¹⁹ Though, all waterways are potentially habitat for sensitive species.
- Few fish passage issues exist along SR 4 East CC, though there are potential conflicts with:²⁰
 - Road crossings
 - Agriculture Runoff
 - Grade control structures
 - Damming structures
 - Slough Intake Diversions
- Marsh Creek is currently supporting a seasonal (endangered) Chinook Salmon population in its lower reaches.²¹
- The entire Corridor is within the San Francisco Bay Area Air Basin, which is designated as a non-attainment area for ozone and for fine particulate matter (PM 2.5) by both the U.S. EPA and the California Air Resources Board. Additionally, PM 10 and ozone levels in the area do not meet the attainment designations for the federal and State ambient air quality standards.
- SR 4 East CC has moderate sensitivity for unrecorded archaeological resources both historic-era and prehistoric. There is a large amount of historic-era farming and mining in the area and the area was popular during prehistoric times. Any work within and proximity to the ROW of SR 4 East CC would require archaeological investigation.
- A potential issue that may arise in SR 4 East CC area is coordination with other State agencies. Many permits including those from the Regional Water Quality Control Board (RWQCB), the California Department of Fish and Wildlife, the U.S. Department of Fish and Wildlife, Reclamation Districts, the U.S.

¹⁷ http://www.conservation.ca.gov/cgs/cgs_history/PublishingImages/FAM_750k_ReleaseStatement_SAMPLE.jpg, accessed September of 2016

¹⁸ <https://www.wildlife.ca.gov/Data/BIOS>, accessed September of 2016

¹⁹ <http://www.rivers.gov/california.php>, accessed August of 2016

²⁰ <https://www.wildlife.ca.gov/Data/BIOS>, accessed September of 2016.

²¹ <http://www.eastbaytimes.com/2017/01/19/endangered-chinook-salmon-return-to-marsh-creek-after-decades/>, accessed May of 2017

Army Corps of Engineers, and State and federal land conservation agencies will be required for projects. One such example includes coordination with the RWQCB, since Caltrans capital maintenance (CAPM) projects require water quality consideration, with water quality remediation areas a challenge to locate.

- Hazardous waste is an area of concern along SR 4 East CC. One such known site exists under the SR4/Balfour Interchange. Caltrans is unable to act as the fee owner, but must hold a highway easement, as the agency is unable to accept property that has hazardous waste contamination. The majority of area surrounding SR 4 East CC was once farmland and it is highly likely that there are other contaminants in the area, or that could be spreading to the highway through groundwater.
- It should be noted Caltrans is now required to address and remove fish passage barriers when completing projects. Barriers need to be addressed when projects are within current or historical fish passage areas.

Table 10. SR 4 East CC Environmental Considerations

2	1	Seg		
Low	Low	Section 4(f) Land		
No		Coastal Zone		
	Med	Farmland/ Timberland		
	Low	Env. Justice		
	Med	Cultural Resources		
Low	High	Visual Aesthetics		
High	Low	Geology/Soils/ Seismic		
100-year	100-year	Floodplain		
n/a	n/a	Climate Change and Sea Level Rise Vulnerability		
Low	Low	Hazardous Materials		
Low	Low	Naturally Occurring Asbestos		
Non-Attainment	Non-Attainment	Air Quality ²²		
			Ozone	PM
			CO	
Low	Low	Noise		
Med	Med	Waters and Wetlands		
n/a	n/a	Wild and Scenic Rivers ²³		
TBD	TBD	Special Status Species		
Low	Low	Fish Passage		
Low	Low	Habitat Connectivity		

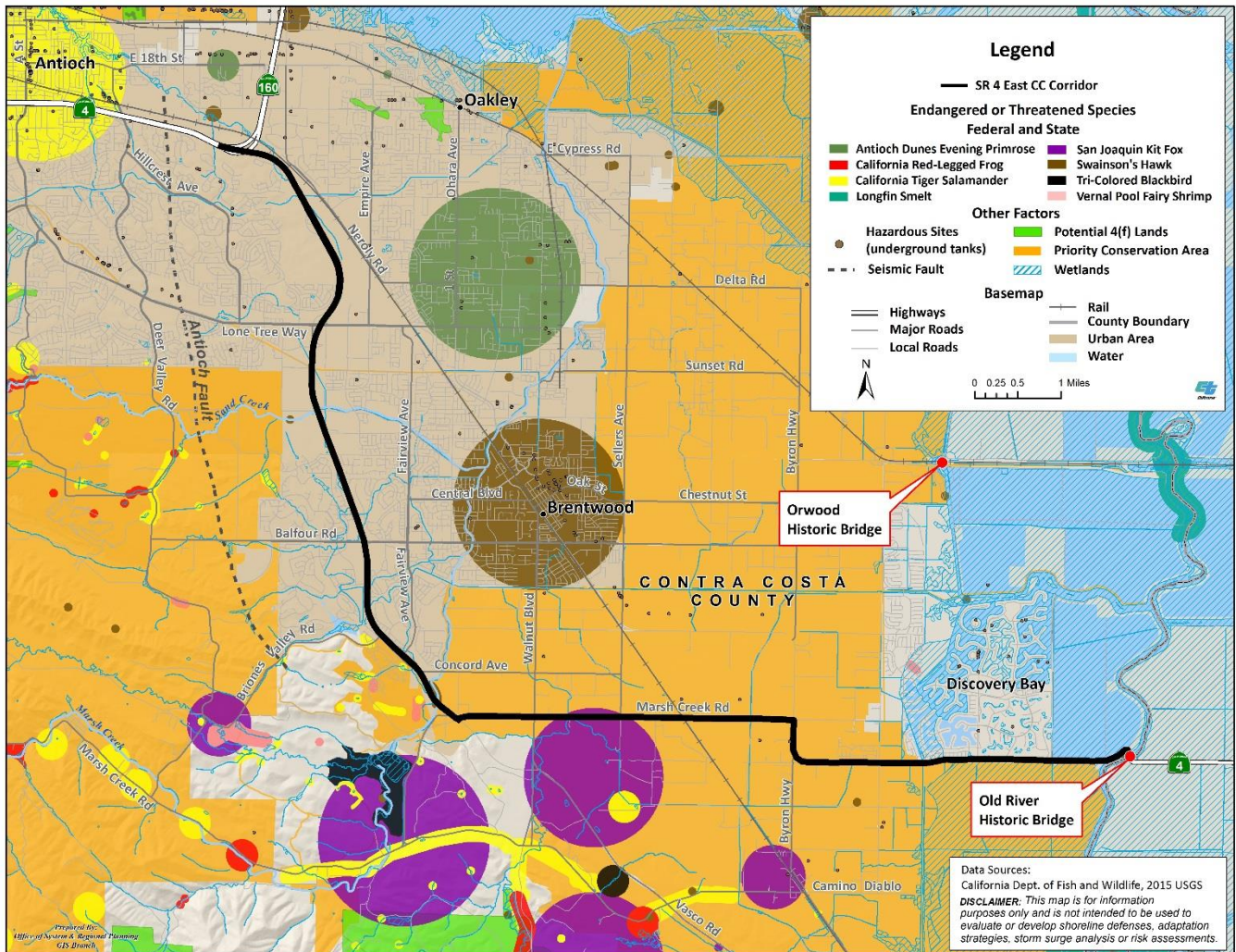
Additionally, it should be noted SR 4 East CC is situated near the San Joaquin – Sacramento River Delta, which is protected by the State's *Delta Protection Act* (DPA). The DPA declares that "the Delta is a natural resource of statewide, national, and international significance, containing irreplaceable resources, and that it is the policy of the State to recognize, preserve, and protect those resources of the Delta for the use and enjoyment of current and future generations, in a manner that protects and enhances the unique values of the Delta as an evolving place."²⁴ The Delta Protection Commission (DPC) is comprised of 15 members pursuant to the provisions of the DPA to represent the interests of recreation, habitat, and agriculture. In 2015, the DPC released the *Vision 2030 Strategic Plan*, which outlines strategic themes focusing on water, agriculture, levees and emergency response, regional economy, Delta heritage, recreation and tourism, and education and outreach.

²² <https://www.arb.ca.gov/desig/adm/adm.htm>, accessed September of 2016.

²³ <http://www.dot.ca.gov/ser/vol1/sec3/special/ch19wsrivers/chap19.htm#WildAgencies>, accessed August of 2016

²⁴ http://www.delta.ca.gov/in_the_news/

Figure 7: SR 4 East CC Environmental Factors Map



Source: Caltrans GIS Unit, 2017

CORRIDOR PERFORMANCE

PERFORMANCE DATA

Traffic performance data for SR 4 East CC was provided by Caltrans District 4 Traffic Forecasting Branch. 2015 was used as the Base Year (BY) for the data provided, and 2040 as the Horizon Year (HY) for the forecast. Table 11 shows data for Average Annual Daily Traffic (AADT), Vehicle Miles Traveled (VMT), average annual daily truck traffic (AADTT), and peak hour traffic data broken down by the two segments that comprise SR 4 East CC.

The majority of the traffic on SR 4 East CC is carried on Segment 1 (where the route was relocated to bypass the downtown core of Brentwood and Oakley). Segment 2 carries a higher percentage of heavy truck traffic, as SR 4 East CC is a major west/east route that connects the Bay Area region with Stockton, a goods movement destination in the San Joaquin Valley.

On both segments the AM peak is westbound, and PM peak in the eastbound direction. Both segments are forecasting a 27 percent increase in AADT by the 2040 Horizon Year (HY). One half of the interchange at SR 4 East CC and Balfour Road will be constructed once Sand Creek Road to Balfour Road has been expanded from two to four lanes. The rest of the interchange will be constructed when road widening from Balfour Road to Marsh Creek Road is programmed. See Table 12 on page 30.

Contra Costa County has developed their State-mandated Congestion Management Program (CMP), which documents major congested corridors in the County, assigns a Level of Service (LOS) standard for each route, and forecasts travel demand. The last update to Contra Costa County's CMP was approved in 2015. The LOS for Segment 1 ranges from B to F.²⁵

²⁵ www.ccta.net/about/download/55fc82036f1ec.pdf, page 27

Table 11. SR 4 East CC Corridor Performance

	Segment 1	Segment 2
	CC 4 R30.13	CC 4 R38.03
PM	–	–
	CC 4 R38.03	CC 4 48.39
Basic System Operations		
AADT (BY 2015)	70,000	26,700
AADT (HY 2040)	88,900	33,900
AADT: Growth Rate/Year	1%	1%
VMT (BY 2015)	300,700	200,500
VMT (HY 2040)	381,900	254,600
Truck Traffic		
Total Average Annual Daily Truck Traffic (AADTT) (BY 2015)	4,500	4,100
Total Average Annual Daily Truck Traffic (AADTT) (HY2040)	5,800	5,200
Total Trucks (% of AADT) (BY 2015)	6.5%	15.4%
Total Trucks (% of AADT) (HY 2040)	6.5%	15.4%
5+ Axle Average Annual Daily Truck Traffic (AADTT) (BY 2015)	3,020	3,010
5+ Axle Average Annual Daily Truck Traffic (AADTT) (HY 2040)	3,840	3,820
5+ Axle Trucks (as % of AADT)(BY 2015)	4.3%	11.3%
5+ Axle Trucks (as % of AADT)(HY 2040)	4.3%	11.3%
Peak Hour Traffic Data		
AM Peak Hour Direction (BY 2015)	WB	WB
AM Peak Hour Directional Split (BY 2015)	52.6%	54.7%
PM Peak Hour Direction (BY 2015)	EB	EB
PM Peak Hour Directional Split (BY 2015)	53.2%	55.2%
AM Peak Hour Direction (HY 2040)	WB	WB
AM Peak Hour Directional Split (HY 2040)	52.6%	54.7%
PM Peak Hour Direction (HY 2040)	EB	EB
PM Peak Hour Directional Split (HY 2040)	53.2%	55.2%
AM Peak Hour Peak Direction V/C (BY 2015)	0.51	0.54
PM Peak Hour Peak Direction V/C (BY 2015)	0.64	0.98
AM Peak Hour Peak Direction V/C (HY 2040)	0.65	0.68
PM Peak Hour Peak Direction V/C (HY 2040)	0.81	1.07

Source: Caltrans District 4 Project Level Forecasting Branch, October 2016

BY = Base Year

HY = Horizon Year

WB = West Bound

EB = East Bound

TECHNOLOGY AND TRAFFIC MANAGEMENT (TSMO)

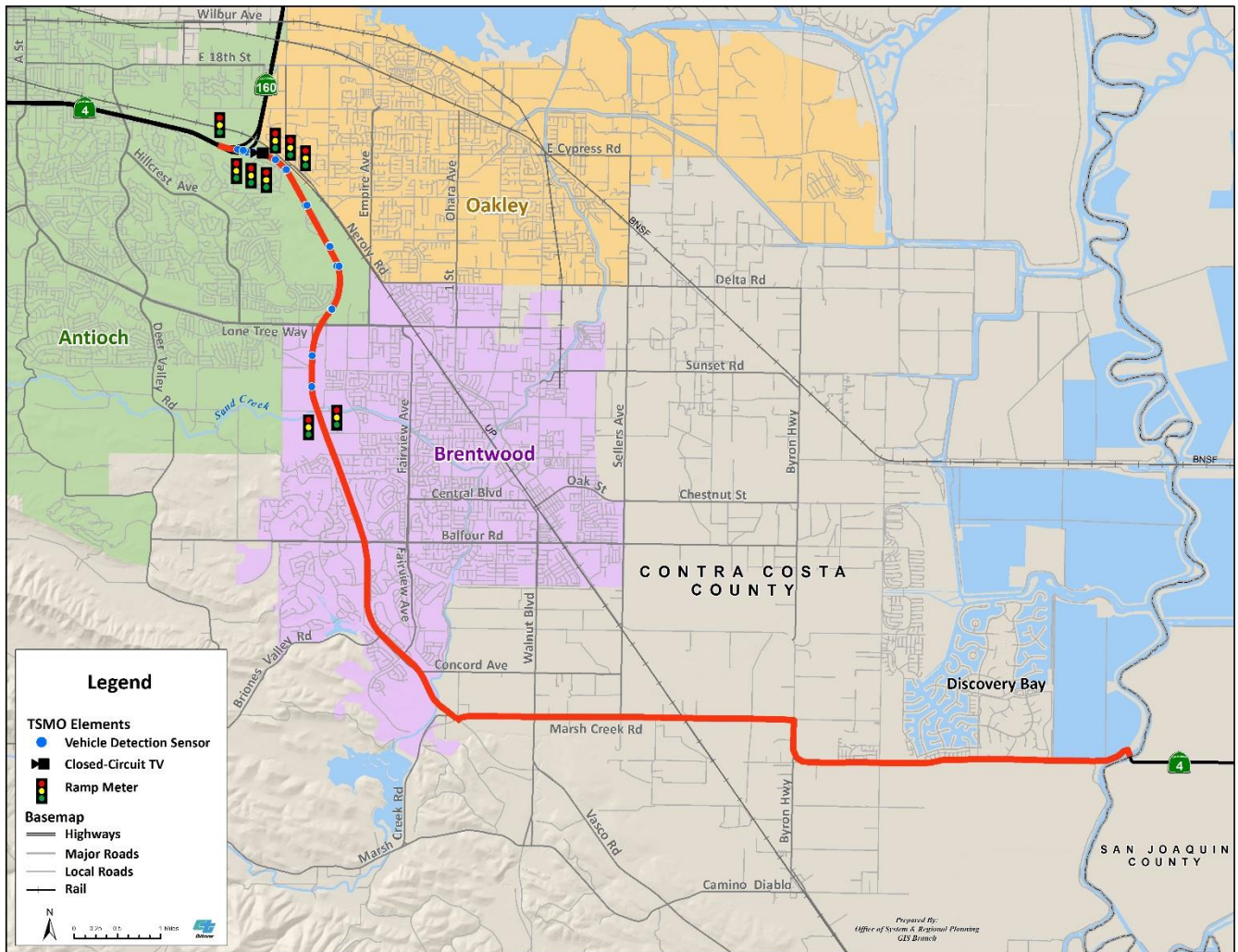
Caltrans is committed to effective TSMO to optimize the performance of California's transportation systems for all users and modes of travel. TSMO strategies are essential to a performance-based decision making process Caltrans will use to improve the efficient and effective operation of the transportation network. Examples of TSMO strategies include, but are not limited to, ramp metering, traffic signal synchronization, ITS and managed lanes. Efficiency can often be achieved by operational improvements through ITS deployments. These include four types of management for improving throughput:

- System management for recurring localized congestion (ramp metering, managed lanes, traveler information, dynamic speed limit, traffic signals and transit priority, ICM, parking management system, automated vehicles).
- Incident management for non-recurrent congestion (detection-verification-response, CCTV, CMS, HAR, weather detection, traveler information system, ICM).
- Event management for emergencies, disasters and other occurrences (through system monitoring, evacuation management, route selection, ICM).
- Asset Management for managing existing infrastructure and other assets to deliver an agreed standard of service. One of the first steps in the efficient management of the transportation system will be the completion and implementation of a Transportation Asset Management Plan.

In partnership with regional and local agencies, and other stakeholders, operational strategies form the basis of Integrated Corridor Management (ICM). TSMO and ICM require proactive integration of the transportation systems to efficiently move people and goods along highly congested urban corridors. TSMO and ICM strategies improve operations of multimodal transportation infrastructure.

Caltrans Strategic Management Plan 2015–2020 has as Strategic Objective to “effectively manage transportation assets by implementing the asset management plan and embracing a fix-it-first philosophy.” The plan specifies a target of maintaining 90 percent or better ITS element health by 2020. Operation and Maintenance (O&M) resources are essential to achieve this fix-it target. As more TSMO/ITS elements are implemented, O&M resource needs will continue to grow.

Figure 8: SR 4 East CC TSMO Inventory (Existing and Planned) Map



Source: Caltrans GIS Unit, 2017

KEY CORRIDOR ISSUES

Segment 2 of SR 4 East CC doesn't have a network that caters to Active Transportation modes. Bicycles and pedestrians are not prohibited on Segment 2 and there are residential and commercial land uses along the segment. However, it should be noted the speed limits are quite high, at 50 to 55 miles per hour, and may impact the safety of active mode users. Improvement should focus on how to safely accommodate bicycles and pedestrians along this segment.

CORRIDOR CONCEPT

CONCEPT RATIONALE

For the next 25 years, the concept for the existing freeway portion of Segment 1 of the SR 4 East CC Corridor (from SR 160 to Balfour Road) is a four- to six-lane freeway. Roadway widening between Sand Creek Road and Balfour Road is currently under construction, and is part of the SR 4 and Balfour Road Interchange Improvement project. For the expressway portion between Balfour Road and Marsh Creek Road, this TCR recommends the route be widened from two to four-lanes. The Balfour Road Interchange is partially funded and constructed, and the remaining portion will be constructed when funding becomes available. There are no plans for the intersection at Marsh Creek Road and Vasco Road to be converted to a full interchange.

For Segment 2, this TCR recommends the conventional highway be expanded from two to four lanes. The expansion will help accommodate future travel demand of people and goods within the SR 4 East CC Corridor. In MTC's Plan Bay Area 2013 (PBA 2013), there are plans for roadway expansion and interchanges projects for the Corridor. While many projects have already or are currently being constructed, the remaining RTP projects are included in Table 12 on the next page. TCR recommendations for both segments are included in Table 13 on page 31 (as well as in Table ES 3 on Page 5).

PLANNED AND PROGRAMMED PROJECTS AND STRATEGIES

Table 12. Planned and Programmed Projects for SR 4 East CC

Seg.	Post Mile	Description	Planned or Programmed	Location	Source
1	Approx. CC 4 34.0	Construct bicycle/pedestrian overcrossings for SR 4 East CC	Programmed	Mokelumne Coast-to-Crest Trail, located between Lone Tree Way and San Creek Road	CC Measure J
1	CC 4 T30.17 - CC 4 T30.65	Install ramp metering	Planned	In Contra Costa County, on SR 4, near the SR 160 interchange	2015 RMDP
1	CC 4 R34.13 - CC 4 R34.14	Turn on ramp metering	Planned	In Contra Costa County, on SR 4, at the Sand Creek Road interchange	2015 RMDP
1	CC 4 R34.59 - CC 4 R36.2	Construct a grade separated Balfour Road interchange (partially under construction)	Programmed	In Contra Costa County, in the City of Brentwood, at the intersection of SR 4 and Balfour Road	CC Measure J
1	CC 4 R30.13 - CC 4 R35.60	eBART Phase II: from Antioch to East Contra Costa County.	Planned	Freeway median.	eBART NSS 2014
1	CC 4 VAR - CC 4 VAR	Install Traffic Operations System (TOS) elements and fiber	Planned	NEW PROJECT, TOS on CC 160 and CC 4 from Bypass Road to SJ County Line	D4 315 Mobility Spread-sheet
1	Off System	Fund and construct planned Park and Ride facility in Oakley (6 bike lockers and 168 parking stalls)	Planned	Main Street and Cypress Road, Oakley, CA	Tri Delta Transit
1	CC 4 R33.48	New Park and Ride Lot	Planned	Mokelumne Trail and SR 4.	Local Plans
1, 2	CC 4 VAR - CC 4 VAR	Improve interchanges and parallel arterials to Route 4	Planned	Various locations	PBA 2013
1, 2	CC 4 R31.00 - CC 4 48.00	Upgrade/construct maintenance vehicle pullouts	Planned	In Contra Costa County, from Oakley to near Discovery Bay	FY 2015/16 – 2016/17 Two-Year PID Workplan for 2018 SHOPP
2	CC 4 48.1 - CC 4 48.3	Near Discovery Bay, at 0.1 mile west of Old River Bridge. Construct retaining walls to repair storm damage slip-outs.	Programmed	Near Discovery Bay, at 0.1 mile west of Old River Bridge.	2016 SHOPP
2	CC 4 43.98 - CC 4 48.39	Bicycle and pedestrian improvements on Marsh Creek Road, and SR 4 east connector, to improve east-west access.	Planned	From intersection at Marsh Creek Road and Byron Highway to CC/SJ County Line.	CCCBPP 2009
2	CC 239	Route 239 PID in Contra Costa County to construct new SR to serve traffic.	Planned	From City of Brentwood to Tracy.	PID

RMDP = Ramp Meter Development Plan

PBA = Plan Bay Area

PID = Project Initiation Document

SHOPP = State Highway Operation and Protection Program

NSS = Next Segment Study

FY = Fiscal Year

CCCBPP = Contra Costa Countywide Bicycle and Pedestrian Plan

CC Measure J = Contra Costa County Sales Tax Measure (2004)

PROJECTS AND STRATEGIES TO ACHIEVE CONCEPT

Table 13. Projects and Strategies for SR 4 East CC

Seg.	Description	Location
1	Improve pavement conditions	PM R30.13 – R37.90
1	Install mainline detection sensors	PM R35.19 – R38.03
1	Expand SR 4 from two- to four-lanes, from Balfour Road to Marsh Creek Road	PM R35.60 – PM R37.90
1	Study new San Joaquins Station location in Oakley	Off system, near BNSF rail route in Oakley
2	Widen Route 4 as continuous 4-lane arterial from Marsh Creek Road to San Joaquin County line.	PM R38.03 – 48.39
2	Near Discovery Bay, develop Class I Shared Path or Class IV Cycle Track and sidewalk	PM 45.0 – 47.0
2	Improve pavement conditions	PM R38.03 – 48.39
2	Study potential bicycle facilities on Segment 2, all bike classes included	PM 43.98 – 48.39

APPENDIX

APPENDIX A GLOSSARY OF TERMS AND ACRONYMS

Acronyms

AADT – Annual Average Daily Traffic
AADTT – Annual Average Daily Truck Traffic
AB – Assembly Bill
ABAG – Association of Bay Area Governments
ADA – Americans with Disabilities Act of 1990
ADT – Average Daily Traffic
Alameda CTC – Alameda County Transportation Commission
ATP – Active Transportation Program
BAAQMD – Bay Area Air Quality Management District
BCDC – Bay Conservation and Development Commission
BRT – Bus Rapid Transit
BY – Base Year
Caltrans – California Department of Transportation
CARB – California Air Resources Board
C/CAG – City/County Association of Governments of San Mateo County
CCC – California Conservation Corps
CCTA – Contra Costa Transportation Authority
CDFW – California Department of Fish and Wildlife
CEC – California Energy Commission
CESA – California Endangered Species Act
CFAC – California Freight Advisory Committee
CFMP – California Freight Mobility Plan
CMA – Congestion Management Agencies
CMAQ – Congestion Mitigation and Air Quality
CMP – Congestion Management Plan
CSFAP – California Sustainable Freight Action Plan
CSMP – Corridor System Management Plan
CEQA- California Environmental Quality Act
CSS – Context Sensitive Solutions
CTC – California Transportation Commission
CTP – California Transportation Plan
DD – Deputy Directive
DSMP – District System Management Plan
ECA – Essential Connectivity Areas
FAST Act – Fixing America’s Surface Transportation Act
FASTLANE – Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies grant program
FHWA – Federal Highway Administration
FSR – Feasibility Study Report
FSTIP – Federal Statewide Transportation Improvement Program
FTA – Federal Transit Administration
FTIP – Federal Transportation Improvement Program
GHG – Greenhouse Gas
GIS – Geographic Information System

HCP – Habitat Conservation Plan
 HOT – High Occupancy Toll lane
 HOV – High Occupancy Vehicle lane
 HY – Horizon Year
 ICM – Integrated Corridor Mobility
 IGR-Intergovernmental Review
 ITIP – Interregional Transportation Improvement Program
 ITS – Intelligent Transportation System
 ITSP – Interregional Transportation Strategic Plan
 KPRA – Kingpin-to-Rear-Axle
 LOS – Level of Service
 MAP-21 – Moving Ahead for Progress in the 21st Century
 MPO – Metropolitan Planning Organizations
 MTC – Metropolitan Transportation Commission
 NOA – Naturally Occurring Asbestos
 NCCP – Natural Community Conservation Plan
 NEPA – National Environmental Policy Act
 NHS – National Highway System
 NHFN – National Highway Freight Network
 NMFN – National Multimodal Freight Network
 NVTa – Napa Valley Transportation Authority
 PAED – Project Approval/Environmental Document
 PBA – Plan Bay Area
 PCA – Priority Conservation Area
 PDA – Priority Development Area
 PFN – Primary Freight Network
 PID – Project Initiation Document
 PIR – Project Initiation Report
 PM – Post Mile
 PM 2.5 – Particulate Matter 2.5 micrometers or less in diameter
 PM 10 – Particulate Matter 10 micrometers or less in diameter
 PSR – Project Study Report
 PR – Project Review
 PTSF – Percent Time Spent Following
 RHNA – Regional Housing Needs Allocation
 RTP- Regional Transportation Plan
 RTIP – Regional Transportation Improvement Program
 RTPA – Regional Transportation Planning Agencies
 SACOG – Sacramento Area Council of Governments
 SAFETEA-LU – Safe, Accountable, Flexible and Efficient Transportation Equity Act, a Legacy for Users
 SB – Senate Bill
 SCS – Sustainable Community Strategies
 SCTA – Sonoma County Transportation Authority
 SFCTA – San Francisco County Transportation Authority
 SHOPP – State Highway Operation Protection Program
 SHS – State Highway System
 SJCOG – San Joaquin Council of Governments
 SMF – Smart Mobility Framework
 SR – State Route
 STA – Solano Transportation Authority

STIP – State Transportation Improvement Program
STP – Surface Transportation Program
STRAHNET – Strategic Highway Network
TAM – Transportation Authority of Marin
TCIF – Trade Corridors Improvement Fund
TCRP – Transit Cooperative Research Program
TEA-21 – Transportation Equity Act for the 21st Century
TCR – Transportation Concept Report
TIGER – Transportation Investment Generating Economic Recovery
TDM – Transportation Demand Management
TMP – Transportation Management Plan
TMS – Transportation Management System
TOS – Traffic Operations System
TSN – Transportation System Network
VMT – Vehicle Miles Traveled
VTA – Santa Clara Valley Transportation Authority
VPH – Vehicles per Hour

Definitions

AADT – Annual Average Daily Traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Traffic counting is generally performed by electronic counting instruments moved from location throughout the state in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Base Year – The year that the most current data is available to the Districts

Bikeway Class I (Bike Path) – Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bikeway Class II (Bike Lane) – Provides a striped lane for one-way bike travel on a street or highway.

Bikeway Class III (Bike Route) – Provides for shared use with pedestrian or motor vehicle traffic.

Bikeway Class IV (Separated Bikeway/Cycle Track) – Provides for exclusive use for bicycles by separating bikeway from motor vehicle traffic.

Bottlenecks – A bottleneck is a location where traffic demand exceeds the effective carrying capacity of the roadway. In most cases, the cause of a bottleneck relates to a sudden reduction in capacity, such as a lane drop, merging and weaving, driver distractions, a surge in demand, or a combination of factors.

Capacity – The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

Capital Facility Concept – The 20-25 year vision of future development on the route to the capital facility. The capital facility can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility (Intercity Passenger Rail, Mass Transit Guideway etc.), grade separation, and new managed lanes.

Conceptual Project– A conceptual improvement or action is a project that is needed to maintain mobility or serve multimodal users, but is not currently included in a fiscally constrained plan and is not currently programmed. It could be included in a General Plan or in the unconstrained section of a long-term plan.

Corridor – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, bicycle, pedestrian, and transit route alignments. Off system facilities are included as informational purposes and not analyzed in the TCR.

Facility Concept – Describe the Facility and strategies that may be needed within 20-25 years. This can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility, Non-capacity increasing operational improvements, new managed lanes, conversion of existing managed lanes to another managed lane type or characteristic, TMS field elements, Transportation Demand Management and Incident Management.

Facility Type – The facility type describes the State Highway facility type. The facility could be freeway, expressway, conventional, or one-way city street.

Freight Generator – Any facility, business, manufacturing plant, distribution center, industrial development, or other location (convergence of commodity and transportation system) that produces significant commodity flow, measured in tonnage, weight, carload, or truck volume.

Horizon Year – The year that the future (20-25 years) data is based on.

Intermodal Freight Facility – Intermodal transport requires more than one mode of transportation. An intermodal freight facility is a location where different transportation modes and networks connect and freight is transferred (or “transloaded”) from one mode, such as rail, to another, such as truck.

ITS – Intelligent Transportation System improves transportation safety and mobility and enhances productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent transportation systems encompass a broad range of wireless and wire line communications-based information and electronics technologies to collect information, process it, and take appropriate actions.

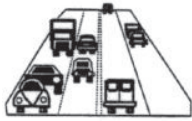
LOS – Level of Service is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. Six levels of LOS can generally be categorized as follows:



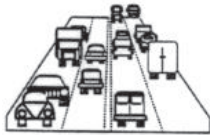
LOS A describes free flowing conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway.



LOS B is also indicative of free-flow conditions. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.



LOS C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver with the traffic stream is now clearly affected by the presence of other vehicles.



LOS D demonstrates a range in which the ability to maneuver is severely restricted because of the traffic congestion. Travel speed begins to be reduced as traffic volume increases.



LOS E reflects operations at or near capacity and is quite unstable. Because the limits of the level of service are approached, service disruptions cannot be damped or readily dissipated.



LOS F is a stop and go, low speed conditions with little or poor maneuverability. Speed and traffic flow may drop to zero and considerable delays occur. For intersections, LOS F describes operations with delay in excess of 60 seconds per vehicle. This level, considered by most drivers unacceptable often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

Multi-modal – The availability of transportation options using different modes within a system or corridor, such as automobile, subway, bus, rail, or air.

System Operations and Management Concept – Describe the system operations and management elements that may be needed within 20-25 years. This can include Non-capacity increasing operational improvements (Aux. lanes, channelization's, turnouts, etc.), conversion of existing managed lanes to another managed lane type or characteristic (e.g. HOV land to HOT lane), TMS Field Elements, Transportation Demand Management, and Incident Management.

Peak Hour – The hour of the day in which the maximum volume occurs across a point on the highway.

Peak Hour Volume – The hourly volume during the highest hour traffic volume of the day traversing a point on a highway segment. It is generally between 6 percent and 10 percent of the ADT. The lower values are generally found on roadways with low volumes.

Planned Project– A planned improvement or action is a project in a fiscally constrained section of a long-term plan, such as an approved Regional or Metropolitan Transportation Plan (RTP or MTP), Capital Improvement Plan, or measure.

Post Mile – A post mile is an identified point on the State Highway System. The milepost values increase from the beginning of a route within a county to the next county line. The milepost values start over again at each county line. Milepost values usually increase from south to north or west to east depending upon the general direction the route follows within the state. The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the remainder of the route within the county will remain unchanged.

Programmed Project– A programmed improvement or action is a project in a near-term programming document identifying funding amounts by year, such as the State Transportation Improvement Program or the State Highway Operations and Protection Program.

Route Designation –A route's designation is adopted through legislation and identifies what system the route is associated with on the State Highway System. A designation denotes what design standards should apply during project development and design. Typical designations include but not limited to National Highway System (NHS), Interregional Route System (IRRS), Scenic Highway System,

Rural – Fewer than 5,000 in population designates a rural area. Limits are based upon population density as determined by the U.S. Census Bureau

Segment – A portion of a facility between two points.

TDM – Transportation Demand Management programs designed to reduce or shift demand for transportation through various means, such as the use of public transportation, carpooling, telework, and alternative work hours. Transportation Demand Management strategies can be used to manage congestion during peak periods and mitigate environmental impacts.

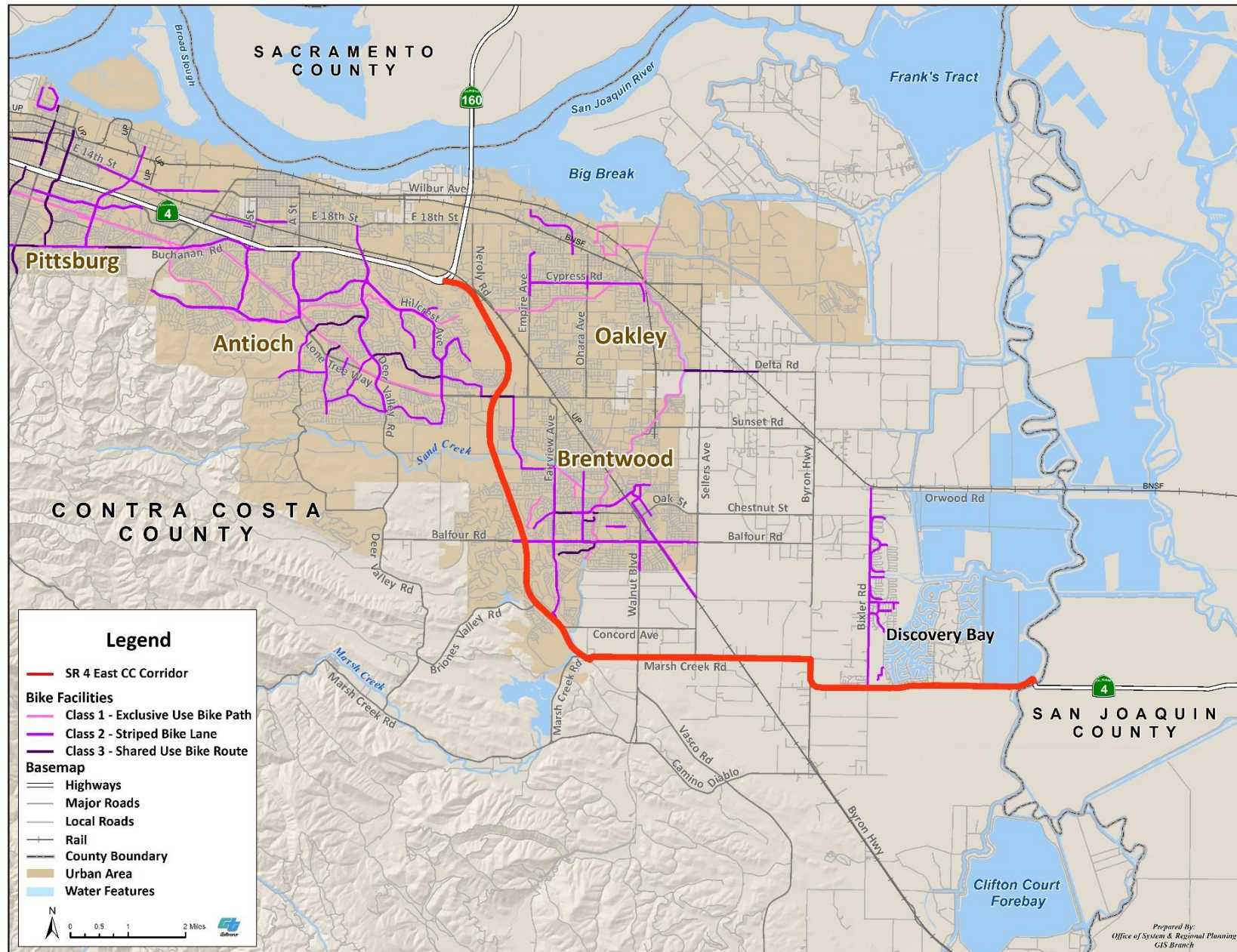
TMS – Transportation Management System is the business processes and associated tools, field elements and communications systems that help maximize the productivity of the transportation system. TMS includes, but is not limited to, advanced operational hardware, software, communications systems and infrastructure, for integrated Advanced Transportation Management Systems and Information Systems, and for Electronic Toll Collection System.

Urban – 5,000 to 49,999 in population designates an urban area. Limits are based upon population density as determined by the U.S. Census Bureau.

Urbanized – Over 50,000 in population designates an urbanized area. Limits are based upon population density as determined by the U.S. Census Bureau.

VMT – Is the total number of miles traveled by motor vehicles on a road or highway segments.

APPENDIX B: BICYCLE FACILITIES ALONG SR 4



APPENDIX C RESOURCES

Association of Bay Area Governments, FOCUS
<http://www.bayareavision.org/initiatives/index.html>

Bay Conservancy & Development Commission
<http://www.bcdc.ca.gov>

California Department of Fish and Game, California Natural Diversity Database, Quickviewer
http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp

California Department of Fish and Game, Biogeographic Information and Observation System (BIOS)
<http://imaps.dfg.ca.gov/viewers/biospublic/app.asp>

California Natural Diversity Database (CNDD)
<http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf>

California Department of Transportation, 2010 Smart Mobility Handbook, Ch 3: Applying the Smart Mobility to Place Types
http://www.dot.ca.gov/hq/tpp/offices/ocp/smf_files/SmMblty_v6-3.22.10_150DPI.pdf

California Department of Transportation District 4, Highway Operations Division, Park and ride
http://www.dot.ca.gov/dist4/highwayops/parkandride/documents/park_ride_lots_master_list_12_14_09.pdf

California Department of Transportation, Division of Transportation System Information, California Road System (CRS) Maps 05M34, 05M35, 05M45 and 06M41
http://dot.ca.gov/hq/tsip/hseb/crs_maps/

California Department of Transportation, Interregional Transportation Strategic Plan (ITSP), June 1998
<http://www.dot.ca.gov/hq/transprog/ocip/te/itsp.pdf>

California Department of Transportation, California Scenic Highway Program
http://www.dot.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm

California Department of Transportation, Traffic Noise Protocol dated March 2011
http://www.dot.ca.gov/hq/env/noise/pub/ca_tnap_may2011.pdf

California, Department of Transportation, Traffic Operations Division, Traffic Data Branch, Traffic Volumes and Truck Traffic
<http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm>

California Department of Transportation, Truck Network on California State Highways, District 4 Map 1 of 1,
<http://www.dot.ca.gov/hq/traffops/trucks/truckmap/truckmap-d04.pdf>

California Department of Transportation, Truck Map Legend Truck Lengths and Routes,
<http://www.dot.ca.gov/hq/traffops/trucks/truckmap/truck-legend.pdf>

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) State Area Designation Maps: Maps, Ozone: http://www.arb.ca.gov/desig/adm/2011/state_o3.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) State Area Designation Maps, PM2.5: http://www.arb.ca.gov/desig/adm/2011/state_pm25.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) State Area Designation Maps, PM 10: http://www.arb.ca.gov/desig/adm/2011/state_pm10.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) State Area Designation Maps, Carbon Monoxide: http://www.arb.ca.gov/desig/adm/2011/state_co.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) National Area Designation Maps, 8 Hour Ozone: http://www.arb.ca.gov/desig/adm/2011/fed_o3.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) National Area Designation Maps, PM 2.5: http://www.arb.ca.gov/desig/adm/2011/fed_pm25.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) National Area Designation Maps, PM 10: http://www.arb.ca.gov/desig/adm/2011/fed_pm10.pdf

The California Environmental Protection Agency (CEPA), Air Resources Board (ARB) National Area Designation Maps, Carbon Monoxide: http://www.arb.ca.gov/desig/adm/2011/fed_co.pdf

The California Streets and Highways Code, Division 1, Chapter 2, Article 3; The State Highway Routes, Section 309
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=shc&group=00001-01000&file=300-635>

California Sea-Level Rise Interim Guidance Document
http://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20110311/12.SLR_Resolution/SLR-Guidance-Document.pdf

The City of San Jose, General Plan
<https://www.sanjoseca.gov/DocumentCenter/Home/View/474>

The Santa Clara Valley Transportation Authority, Bus and Rail Map
http://www.vta.org/schedules/schedules_bymap.html

The Santa Clara Valley Transportation Authority, Congestion Management Program

<http://www.vta.org/cmp/>

The Santa Clara Valley Transportation Authority, Countywide Bicycle Plan

http://www.vta.org/schedules/bikeways_plan.html

The Santa Clara Valley Transportation Authority, Valley Transportation Plan 2040

<http://www.vta.org/vtp/index.html>

The Town of Los Gatos, General Plan

<http://www.losgatosca.gov/index.aspx?nid=27>

U.S. Census Bureau, United States Census 2010, State & County Quickfacts

<http://quickfacts.census.gov/qfd/states/06000.html>

U.S. Census Bureau, United States Census 2010, Community Facts

<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

United State Geological Survey, Liquefaction Hazard Map,

<http://earthquake.usgs.gov/regional/nca/qmap/>